OCTOBER, 1944

VOLUME 35 • NUMBER 4

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All photographs appearing in this issue were made available to FLYING by the United States Navy. Many were taken especially for this issue by the Photographic Unit, Training Literature Section, Bureau of Aeronautics, and flown to the United States from advanced bases and Fleet carriers.

Special Issue

U. S. NAVAL AVIATION AT WAR

WILLIAM B. ZIFF
Editor and Publisher

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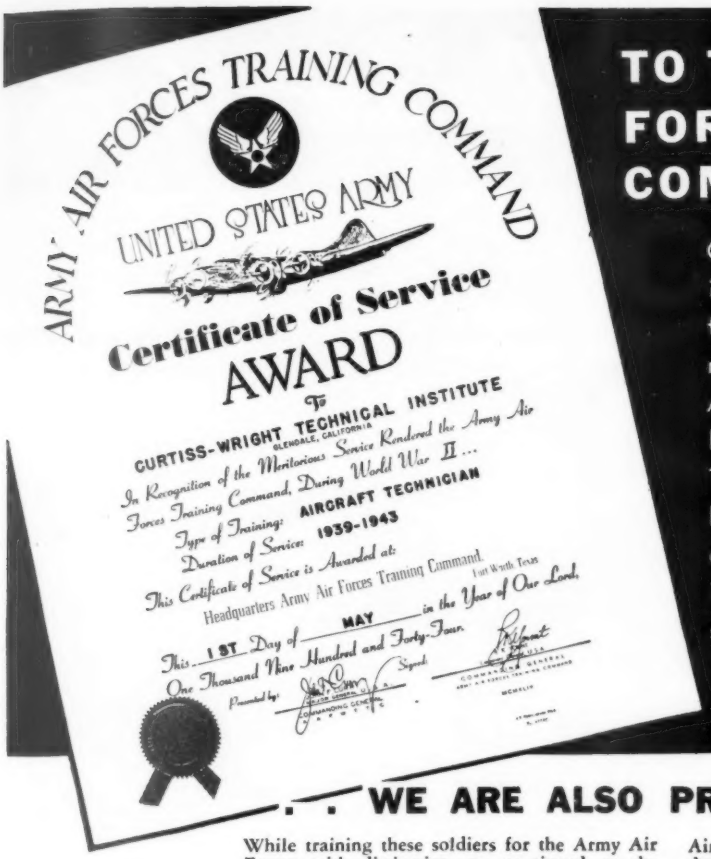
ARMY AIR FORCES TRAINING COMMAND
UNITED STATES ARMY
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AWARD
To
CURTISS-WRIGHT TECHNICAL INSTITUTE
GLENDALE, CALIFORNIA
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Type of Training: AIRCRAFT TECHNICIAN
Duration of Service: 1939-1943
This Certificate of Service is Awarded at:
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Fort Worth, Texas
This 1 ST Day of MAY in the Year of Our Lord,
One Thousand Nine Hundred and Forty-Four.
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ARMY AIR FORCES TRAINING COMMAND

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Curtiss-Wright Technical Institute is deeply proud and highly honored that its record has entitled it to receive the Certificate of Service Award, for "Meritorious Service Rendered" in Training Aircraft Technicians for the Army Air Forces. This recognition will be a continuing source of inspiration to improve and maintain the highest standards in aeronautical training.

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While training these soldiers for the Army Air Forces with distinction, we continued, at the same time to train men in civil life for the gigantic aircraft Production Front.

Today, as in the past, Curtiss-Wright Technical Institute offers you the best to be had in specialized and proven training in Aeronautical Engineering and Master Aviation Mechanics and is now training far-sighted young men, providing them with a foundation for a future, designed to enable them to advance to positions of responsibility and trust in aviation, as well as enhancing their earning power.

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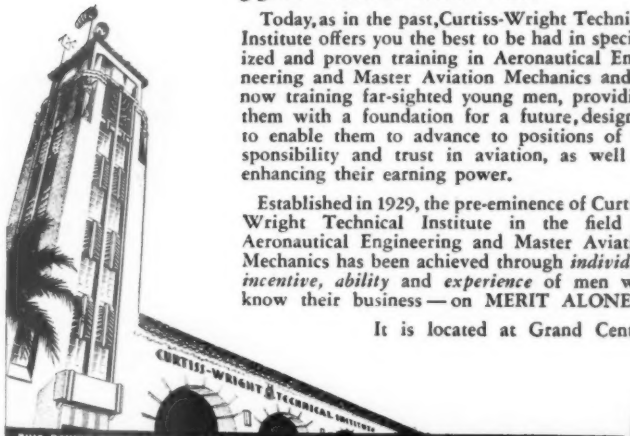
Our graduates are making good in all phases of Aeronautics. What Curtiss-Wright Technical Institute has done for them it can do for you. Take advantage of today's opportunity NOW. Send coupon for full information TODAY.

TO YOUNG MEN OF 17

Continue and complete your High School education, if possible. But, if your plans are upset and you are indecisive as to what course to follow under today's trying circumstances, *Mail the Coupon*, stating your birth date, TODAY. We will send you full information about an opportunity to complete your education for a lifetime career plus training for greater practical value to the war effort, both at the same time. —— NO FLYING INVOLVED ——



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1225 AIRWAY, GLENDALE 1, CALIFORNIA
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UNDER PERSONAL SUPERVISION OF MAJOR C. C. MOSELEY, PRESIDENT AND FOUNDER, SINCE 1929

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MAIL TODAY • DON'T DELAY

WITHOUT COST OR OBLIGATION SEND ME FULL INFORMATION AND CATALOG ON THE COURSE CHECKED BELOW

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F-10

BUY WAR BONDS

G.I.s Have Post-War Ideas, Too!

THERE GOES OUR PIPER CUB AIR SUPPORT!
I'M GOING TO GET A CUB WHEN I GO HOME!
YEAH— ME TOO!
BOY, THEN I CAN HUNT AND FISH IN PLACES I NEVER DREAMED OF!
AND I CAN DUST CROPS ON THE FARM!
THE ONLY HITCH IS, MY TOWN HASN'T ANY LANDING FIELD!
WELL, YOUR TOWN FATHERS BETTER GET BUSY!
14-67

PREPARE NOW FOR THE COMING AIR AGE

Thousands of towns and cities are already planning post-war landing facilities —one or more inexpensive strips or small airports for light planes. When the boys and girls return from Service, they will be able to fly their Piper Cubs most everywhere. You, too, will enjoy the safety and economy of a Piper Cub. And wide-awake communities that prepare today for the coming air age will prosper. Ask *your* officials what steps they are taking—and give them one of our new booklets described below.

GET THIS FREE BOOKLET NOW!

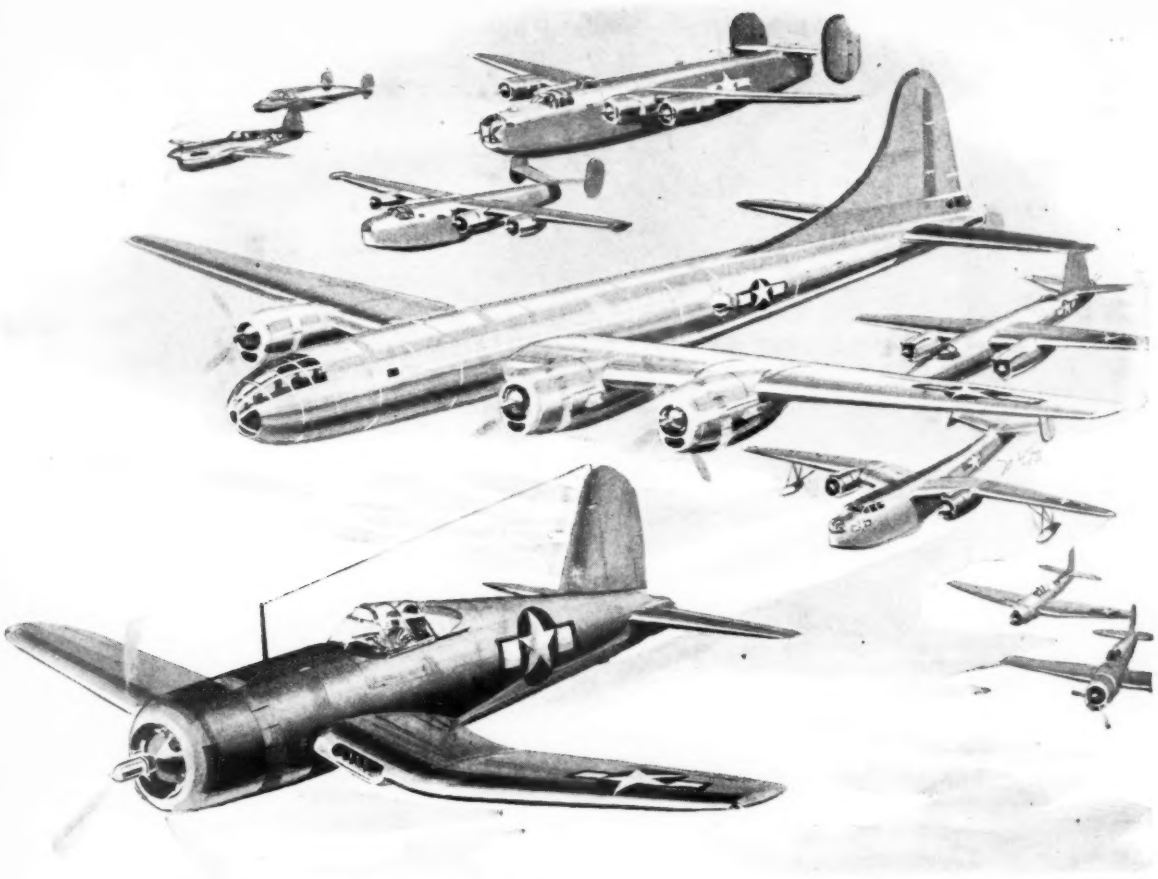
It illustrates and describes "What Your Town Needs for the Coming Air Age"—inexpensive landing facilities of all types. Has helped thousands of town and city officials. Now in its second edition! For your free copy, write Piper Aircraft Corporation, Department PA104W, Lock Haven, Pennsylvania.

GET YOUR AVIATION BOOKLET, TOO—"Piper Cub . . . In War and In Peace." Full color, 32 pages. Covers history of light plane, Piper Cub planes, coming air age, how to fly. Enclose 10c in stamps or coin for postage-handling. Write Piper Aircraft Corporation, Dept. PA104, Lock Haven, Penna.

16mm. SOUND FILM—"The Construction of a Light Airplane." For distribution points write: Supervisor, Audio-Visual Aids, Extension Services, Pennsylvania State College, State College, Pennsylvania.

PIPER *Cub*

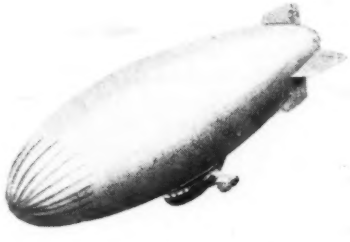
Points the Way to Wings for All Americans



A GREAT NAME IN AIRCRAFT

—for 16 reasons

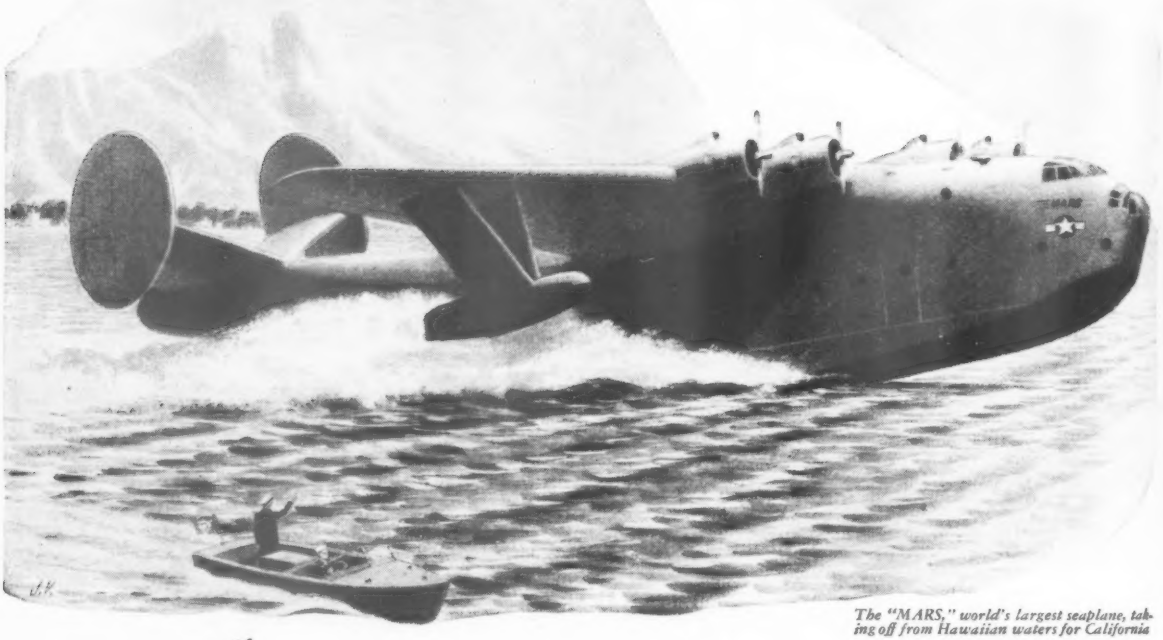
IN addition to building complete Corsair fighters and patrol airships for the Navy, Goodyear Aircraft Corporation is producing one or more major components for 14 of America's most famous warplanes. These include wings, ailerons, flaps, empennages and other sections for all types of ships from the fleet Lightning to the mighty Superfortress. And the splendid battle record of these ships around the world attests the excellence of craftsmanship at Goodyear — one of the great names in aircraft.



BUY WAR BONDS—
BUY FOR KEEPS

NAVAL AVIATION

WHERE PERFORMANCE REALLY COUNTS...



The "MARS," world's largest seaplane, taking off from Hawaiian waters for California

...Dependable CHAMPION SPARK PLUGS

Are On Active Duty!

As engines increase in horsepower, and the size and carrying capacity of aircraft goes up, spark plugs become more and more a determining factor in performance and dependability. Champion-Ceramic Aircraft Spark Plugs in both radio shielded and unshielded types have earned an outstanding reputation for dependability, based solely on their performance on active duty with all branches of our air forces. The primary reason for this record lies in the specially developed insulating material used in all Champion-Ceramic Aircraft Spark Plugs. This material possesses unequalled dielectric strength, exceptional resistance to heat and mechanical shock, and is practically impervious to moisture, fuel and oil absorption. As a result, the insulating properties of Champion insulators remain highly stable under the widest variation in temperatures and pressures.

C26—Unshielded

INSTALL CHAMPIONS AND FLY WITH CONFIDENCE

THE KOLLSMAN TRUE AIRSPEED INDICATOR is a triumph of instrument-making skill, giving immediate dial indication of *true* airspeed and relieving the pilot or navigator of the task—and the hazard—of computing this vital factor in air navigation. This new Kollsman instrument combines airspeed indicator, altimeter and thermometer into one interacting assembly. By this means, indicated airspeed is continuously and automatically corrected for altitude, temperature and compressibility factor. True airspeed is read directly from its dial. In thus simplifying air navigation and ridding it of a source of possible error, Kollsman engineering makes another noteworthy contribution to aviation progress.

KOLLSMAN AIRCRAFT INSTRUMENTS

PRODUCT OF

SQUARE D COMPANY

ELMHURST, NEW YORK • GLENDALE, CALIFORNIA

Newest ice protection development . . . the electrically heated propeller shoe

WITHOUT PROTECTION, ice forms on propeller blades, causing loss of thrust, unbalance, and excessive engine vibration. Then, too, there is the danger and annoyance caused by ice flying off in large chunks and hitting the windscreen or fuselage.

It has long been felt that a heated blade covering would be an efficient method of protecting propellers against icing. This type of ice preventer would be particularly well suited for use on long-range military aircraft.

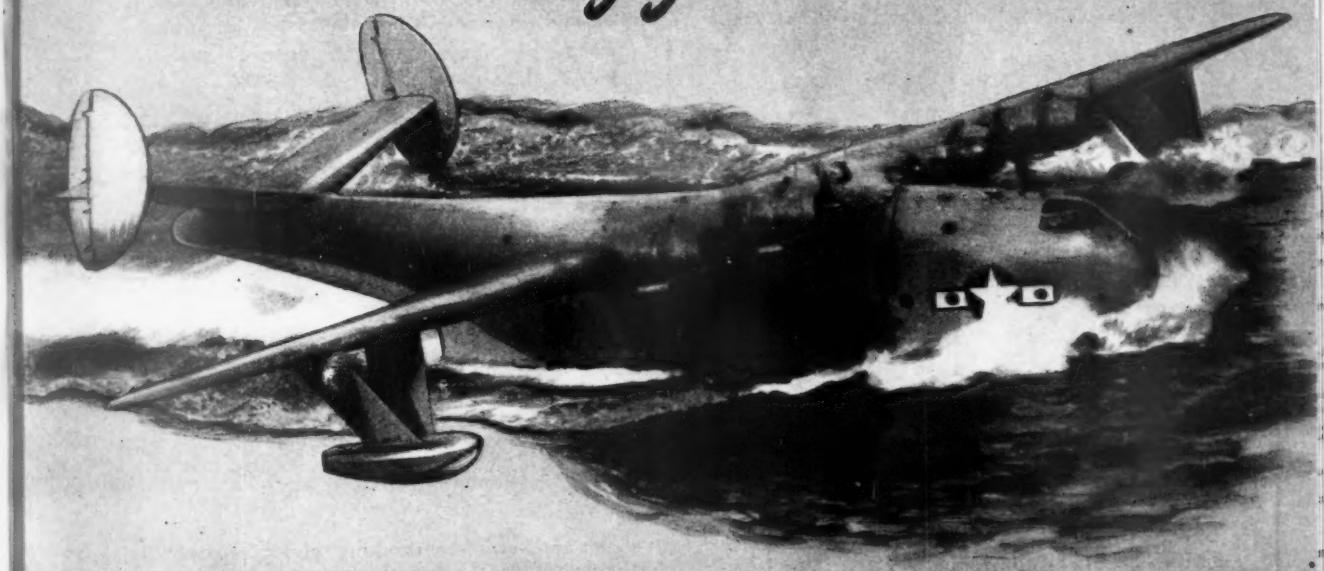
Years ago, B. F. Goodrich engineers began development work on this type of blade covering. Today, the electrically heated propeller shoe is a reality . . . and it has performed amazingly well.

This new ice protection device, containing synthetic rubber, fits over and is cemented to the propeller blades' leading edges. It covers the area of the leading edge, where icing usually occurs. Electrical current from a generator (which may be mounted on the hub) produces heat in the shoe material. A special construction of the shoe concentrates heat at the leading edge, where ice protection is most vital. Efficiency is promoted by electrical and heat insulation at the blade side of the shoe.

The surface of the shoe is smooth, and conforms to the contour of the blade when cemented on. Thus, there are no irregularities to upset air-flow. Because the shoe keeps ice from forming, maximum thrust is preserved—unbalance and engine vibration is minimized. The shoe also provides a highly abrasion-resistant covering for the blade. *The B. F. Goodrich Co., Aeronautical Div., Akron, O.*

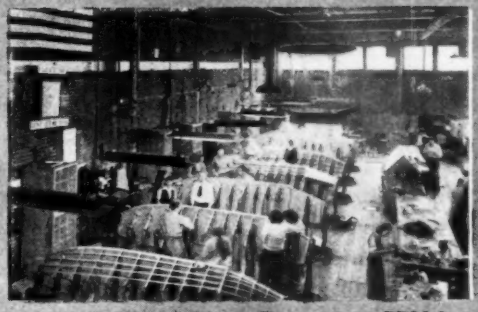
Skyway or Highway
B.F. Goodrich
FIRST IN RUBBER

BIG FLOATS FOR THE NAVY'S *Biggest Plane*



Now in production at Bellanca, the wing floats for the 70-ton MARS (Martin JRM-1) measure over 17 feet, with far greater buoyancy than the wartime float built in such large numbers by Bellanca for the Mariner (Martin PBM-3). Bellanca is proud to be associated with the Navy's giant flying boat, a great carrier for war or peace—and the PBM-3, famed for innumerable missions against our enemies. To this specialized Navy assignment, Bellanca brings the unusual combination of today's outstanding engineering ability, a background of yesterday's most brilliant historic achievement, and the vision of tomorrow's finest aircraft. Float construction is but one of the many tasks in Army and Navy warcraft armament and vital components to which the long-established and widely-experienced Bellanca organization has adapted its personnel and facilities with the conviction that manufacturing versatility is an important contribution to Victory...Bellanca Aircraft Corporation, New Castle, Delaware. Dept. S-1.

Keep on Buying U.S. WAR BONDS



A corner of the Floats Department—PBM-3 float frames under construction at Bellanca

The Mariner (PBM-3) on take-off run, showing Bellanca-built wing float in action

BELLANCA

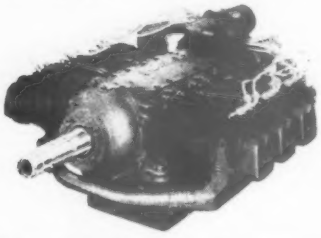
HERE'S THE POSTWAR PLANE

YOU ORDERED

Thousands of aviation-minded men and women responded to our invitation to tell us what they want in their postwar plane. Here's their answer.

...and the engine

65% want one engine (as compared with 33% two-engine fans) of the following specifications:



Air-cooled, horizontally-opposed 57%; Liquid-cooled 6%; Air-cooled in line 21%; Radial 12%; Geared 27%; Direct 38%.

Cylinders: Four 14%; Six 32%; Seven 3%; Eight 6%; Nine 2%: Twelve 2%.

Horsepower: Less than 100, 28%; 100-150, 42%; over 150, 29%.

Both in specification and price, the Franklin engine is the preferred power plant for the postwar plane you want.

People are seriously thinking about postwar flying. That is proved by the fact that our "postwar plane questionnaire" drew replies from one out of every four who received it. 55% of these have no connection with the aviation industry.

Most of these volunteer "specification writers" (87%) prefer a monoplane. 51.3% want low wings. 64.5% said to make it a straight land plane.

The engine chosen by 57% is air-cooled, horizontally-opposed, with 32% preferring 6 cylinders.

68% want retractable landing gear, and 51% prefer the tricycle to the conventional two-wheel (10%). 46% specify fixed wings, although 29% are interested in folding or detachable wings for roadability. 55% want metal fuselage, and 48% metal wing covering. Cruising speeds of 115-150 mph are preferred by 59%; landing speed, 40-50 mph; cruising range, 400-600 miles.

Seating capacity, 4 persons; 25-50 lbs. baggage per person. 75% ask for wing flaps and 37% for slots. Accessories will include electric starter and generator, magneto ignition and radio receiver and transmitter.

Preferred cost is about $2500, and 84% will use their planes for combination of business and pleasure. The summarized questionnaire gives these and other preferences in detail.

Franklin

FINE AIRCRAFT ENGINES

AIRCOOLED MOTORS CORP. **SYRACUSE 8, NEW YORK**

PIONEER INSTRUMENTS . . Vital equipment now helping to clinch Victory . . and destined to play an important role in the great new aviation developments that will follow the war.

ACCELEROMETERS ★ AIRSPEED INDICATORS ★ ALTIMETERS ★ AUTOSYN INDICATORS ★ AUTOSYN TRANSMITTERS ★ RATE OF CLIMB INDICATORS ★ COMPASSES ★ DRIFT METERS ★ GYRO FLUX GATE COMPASSES ★ INVERTERS ★ MAGNESYN REMOTE INDICATING COMPASSES ★ MANIFOLD PRESSURE GAUGES ★ OCTANTS ★ OXYGEN REGULATORS ★ PRESSURE GAUGES ★ REMOTE INDICATING COMPASSES ★ SEXTANTS ★ SUCTION GAUGES ★ TACHOMETERS ★ TURN AND BANK INDICATORS ★ WARNING UNITS

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ECLIPSE-PIONEER DIVISION

Teterboro, New Jersey

THE INVISIBLE CREW
Precision Equipment by Bendix Aviation Corporation

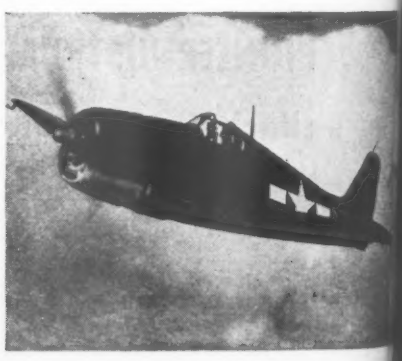
METAL · MODERN ·

You'll always eye your SILVAIRE pridefully. Gleaming, enduring metal, like today's rugged and victorious battleplanes. Built to fly comfortably, frequently, far. Designed to elicit envying regard. The SILVAIRE has been *proved* by wartime use in the C.A.A.-War Training Service, Civil Air Patrol, in the Armed Forces. It has had hard use the world over. It has long been *approved* by discriminating owners and pilots for its all-metal construction, efficient aerodynamic design, its beauty. Your SILVAIRE *will be improved* by our experience in fabricating warplane assemblies. It will again be styled to magnificence by America's top designers. And it is wisdom to enjoy its low depreciation and operating cost, its easy repairability, freedom from maintenance and high resale value. These less obvious excellences also further your long run pleasure in the possession of The Luscombe SILVAIRE.

WAR WORK for the duration is our business. Our job continues to be the production of such vital parts as tail assemblies, ammunition boxes, bomb bay doors, engine enclosures, gunners' seats, carburetor assemblies, machined parts and dozens of other elements for such famous war planes as are pictured here. *However, the War Production Board has released an ample supply of parts for the maintenance of the four-year pre-war production of* SILVAIRES *now in daily use.*

EASTERN TBM "Avenger"

CURTISS C-46 "Commando"



GRUMMAN F6F "Hellcat"

These are a few of the planes for which Luscombe is fabricating metal assemblies

LUSCOMBE AIRPLA

★ ★

Magnificent!

The Luscombe SILVAIRE

YOURS WHEN THE WAR IS WON, the new and distinguished Luscombe SILVAIRE is the finished product derivative of a long line of all-metal planes . . . proved, improved, smartly styled. You are invited to write for full information NOW.

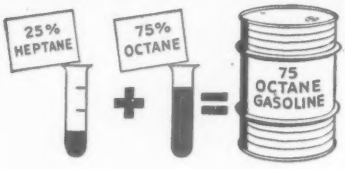
Please direct your inquiry to Department H

PLANE CORPORATION

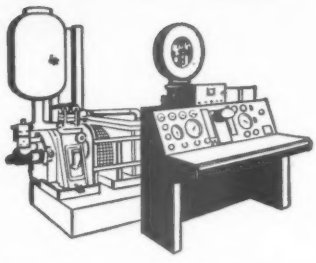
Trenton 7, New Jersey

"Just whadda they mean 100-OCTANE?"

That's a fair question, Joe. So here's a quick look at how aviation super-fuel gets its octane rating.



Octane number is a measure of a gasoline's resistance to detonation or knocking. The first variable-compression testing engine for determining aviation gasoline's octane number was developed by Standard of California in 1924. Gasoline was fed into this engine alternately with a mixture of two liquids called heptane (low anti-knock value) and iso-octane (high anti-knock value). If the gasoline made the testing engine knock with the same intensity as, for instance, a mixture of 25% heptane and 75% iso-octane, its octane number was 75. If it had matched the anti-knock performance of pure iso-octane, it would have been 100-octane gasoline.

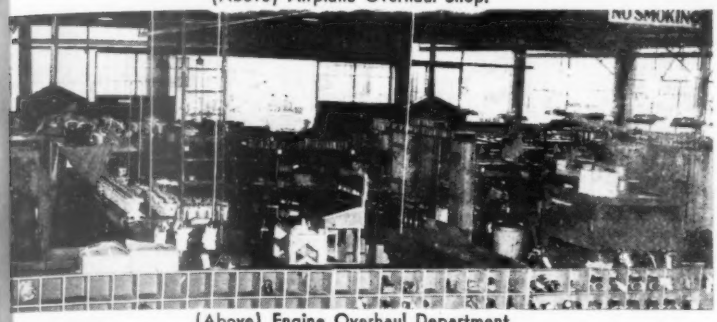


Nowadays, anti-knock requirements of aviation engines are so vastly different that the old rating method won't work. So, California Research Corporation, a subsidiary of Standard of California, developed the apparatus you see above. Details are still secret, but in Standard laboratories it has helped to perfect 100-octane gasoline — and enabled our scientists to unleash new power for aircraft engines. And, used in daily refinery tests, it helps keep the quality of Standard Aviation Gasoline skyhigh—the way flyers everywhere have learned to expect it.

STANDARD AVIATION PRODUCTS

STANDARD OF CALIFORNIA

(Above) Airplane Overhaul Shop.



(Above) Engine Overhaul Department.

(Above) Instrument Repair and Overhaul Department.

(Above) Propeller Repair and Overhaul Department.

(Above) Radio Manufacturing and Repair Department.

100% Approved Aircraft Overhaul and Repair Service

One of the highest rated repair stations in the country . . . SPARTAN AERO REPAIR, located in the heart of the nation . . . is at the service of private aircraft owners.

Here is 100% Government Approved service for the repair and overhaul of everything on a private airplane whether it be of wood, fabric or metal construction; also expert service for all the component parts—engines, propellers, radio, instruments, etc.

Here are the most extensive and modern facilities of their kind in this part of the country—a corps of expert workers—latest engine test stands—air conditioned and humidified woodshop and wood storage—latest test equipment for engines and accessories—entirely complete instrument shop and radio shop.

Previously under contract to the Army Air Force, Spartan's entire facilities are now available to you.

Private aircraft owners and fleet operators are getting expert overhaul work at Spartan at reasonable prices. Spartan can serve *you* in the same satisfactory way.

WRITE TODAY for complete information. Address Department F 104.

SPARTAN AERO REPAIR

Division of SPARTAN AIRCRAFT COMPANY
TULSA, OKLA.

Established 1928

Plumping a bomb squarely amidships on a Jap oil barge off the coast of New Ireland, a U. S. Navy Consolidated LIBERATOR also brings back dramatic photographic proof of its "strike." Official U. S. Navy Photograph.

BULL'S-EYE

Good picture — to Americans. Not so good from Tojo's viewpoint. And as each giant, 4-motored Liberator "scores again," the day when our boys will be home moves just that much closer.

We here at CECO think of that often . . . for we know that the carburetors and fuel pumps we are building for these great Liberators and other planes are a part of the whole tremendous pattern of Victory . . . a Victory that American boys are assuring by their unparalleled courage and skill.

We look forward to more pictures like the one above.

CECO

CARBURETORS
FUEL PUMPS
PROTEK-PLUGS

CHANDLER-EVANS CORPORATION SOUTH MERIDEN CONNECTICUT, U. S. A.

HOCKADAY
COMET
AIRCRAFT CORPORATION

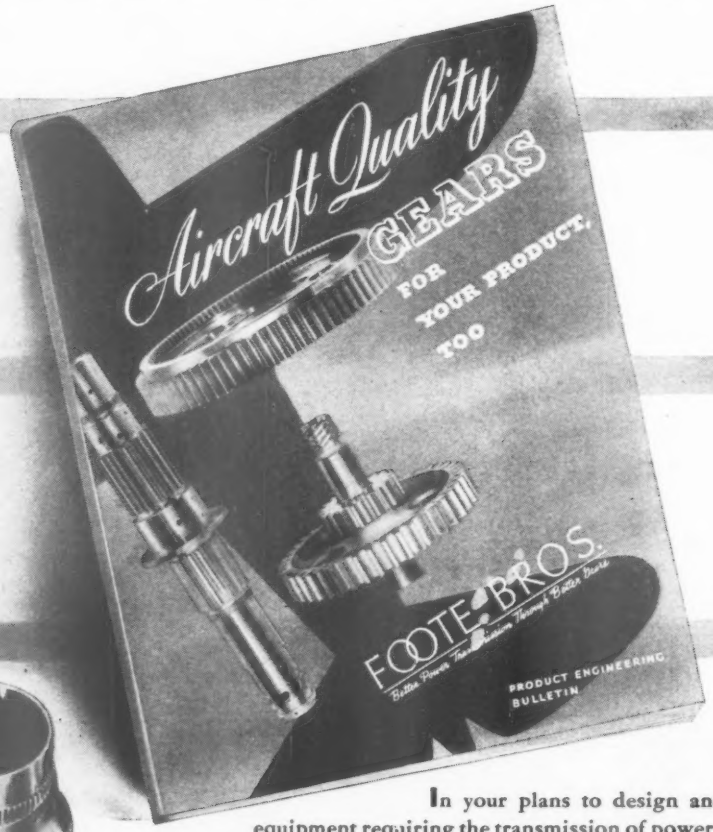
A PEEK AT POSTWAR PRIVATE FLYING

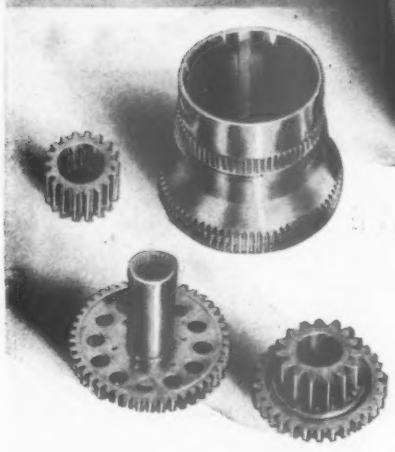
Take speed, ease, proven design and all refinements dictated by war and you have the Hockaday Comet . . . perfect for postwar private flying! Possessing new performance standards in flight tests, the Comet is scheduled for early volume production. Seating two in tandem enclosed cabin

copy on the packethook. Write for "A Peek at Postwar Flying," an illustrated booklet chock full of thrilling Comet facts. Dealer opportunities beckon.

HOCKADAY AIRCRAFT CORPORATION
[illegible]

Better Power Transmission
THROUGH BETTER GEARS





In your plans to design and manufacture any equipment requiring the transmission of power, "Aircraft Quality" Gears offer your engineers the advantages of greater mechanical efficiency, lighter weight, longer life, greater compactness and quieter operation. These gears are now being produced in amazing quantities to power the world's greatest air force—they will be available to you as soon as war conditions permit.

A product engineering bulletin on these revolutionary gears is in preparation and will be sent to manufacturers interested in "better power transmission through better gears" as soon as it is off the press. If you would like to receive a copy when it is ready, mail the coupon below.

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Better Power Transmission Through Better Gears

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Please send me a copy of Engineering Bulletin on "Aircraft Quality" Gears as soon as it is available.

Name.....*Position*.....

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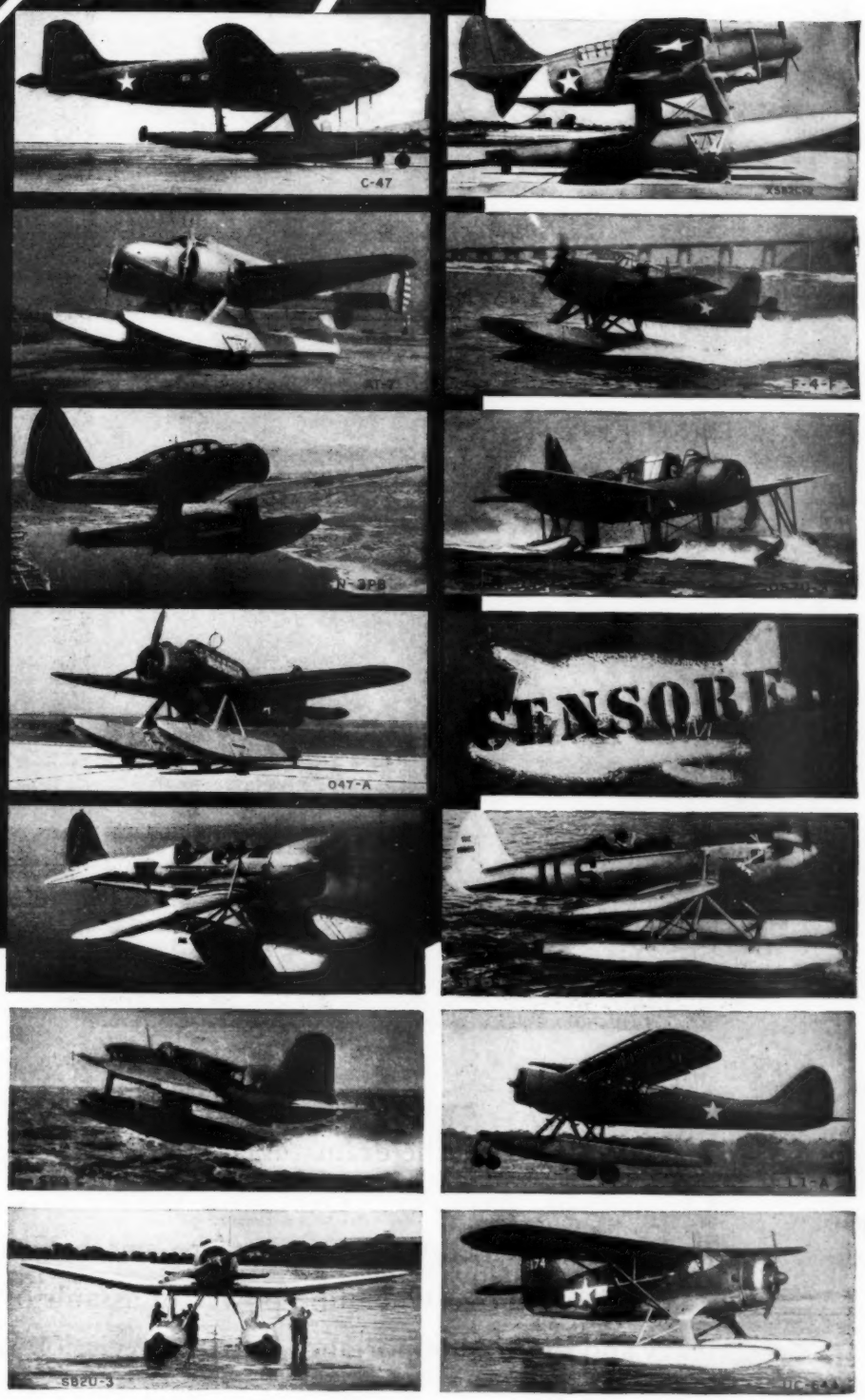
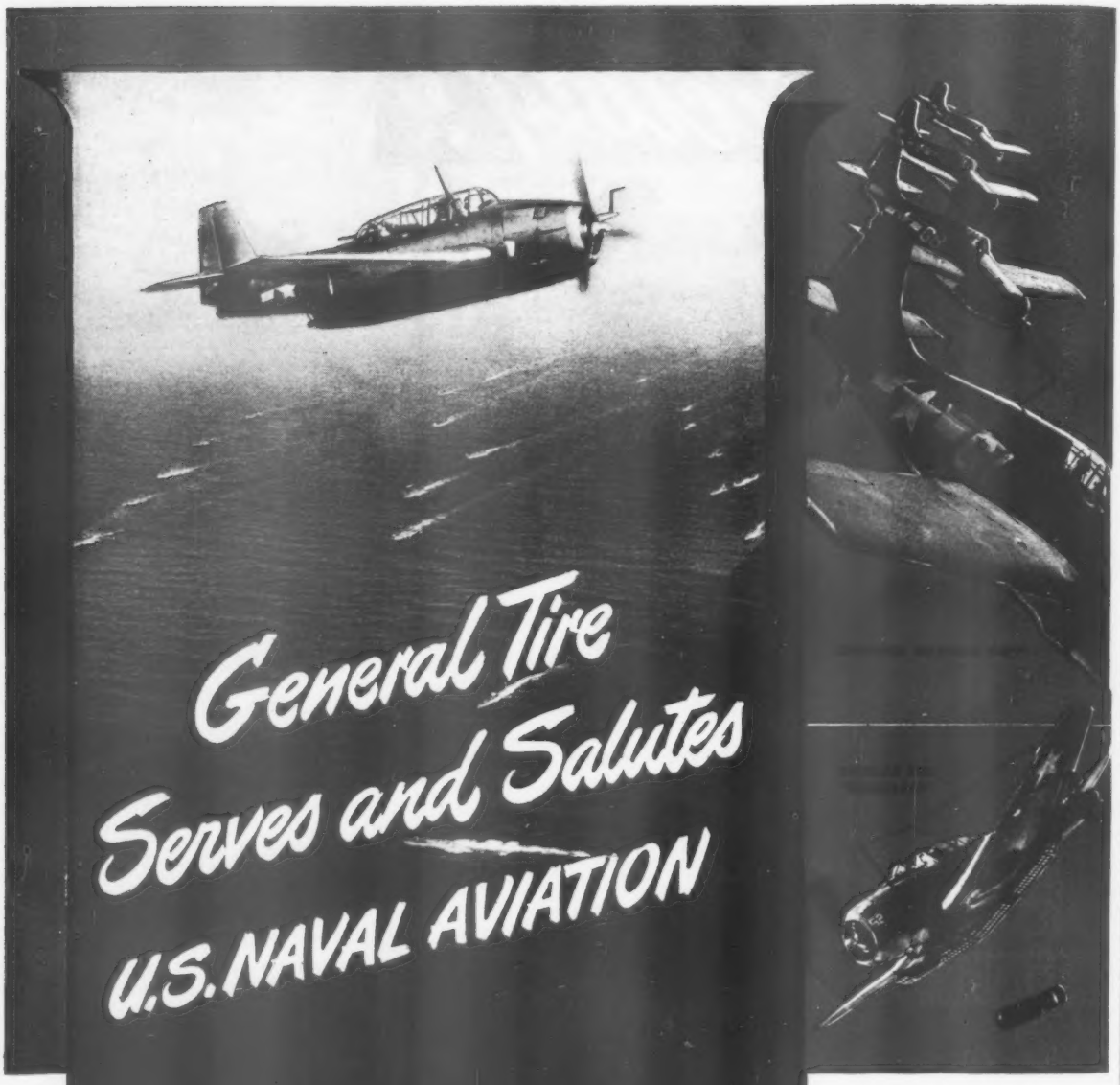
City.....*State*.....

for Victory!

FLOAT PLANES THAT SERVE THE UNITED NATIONS



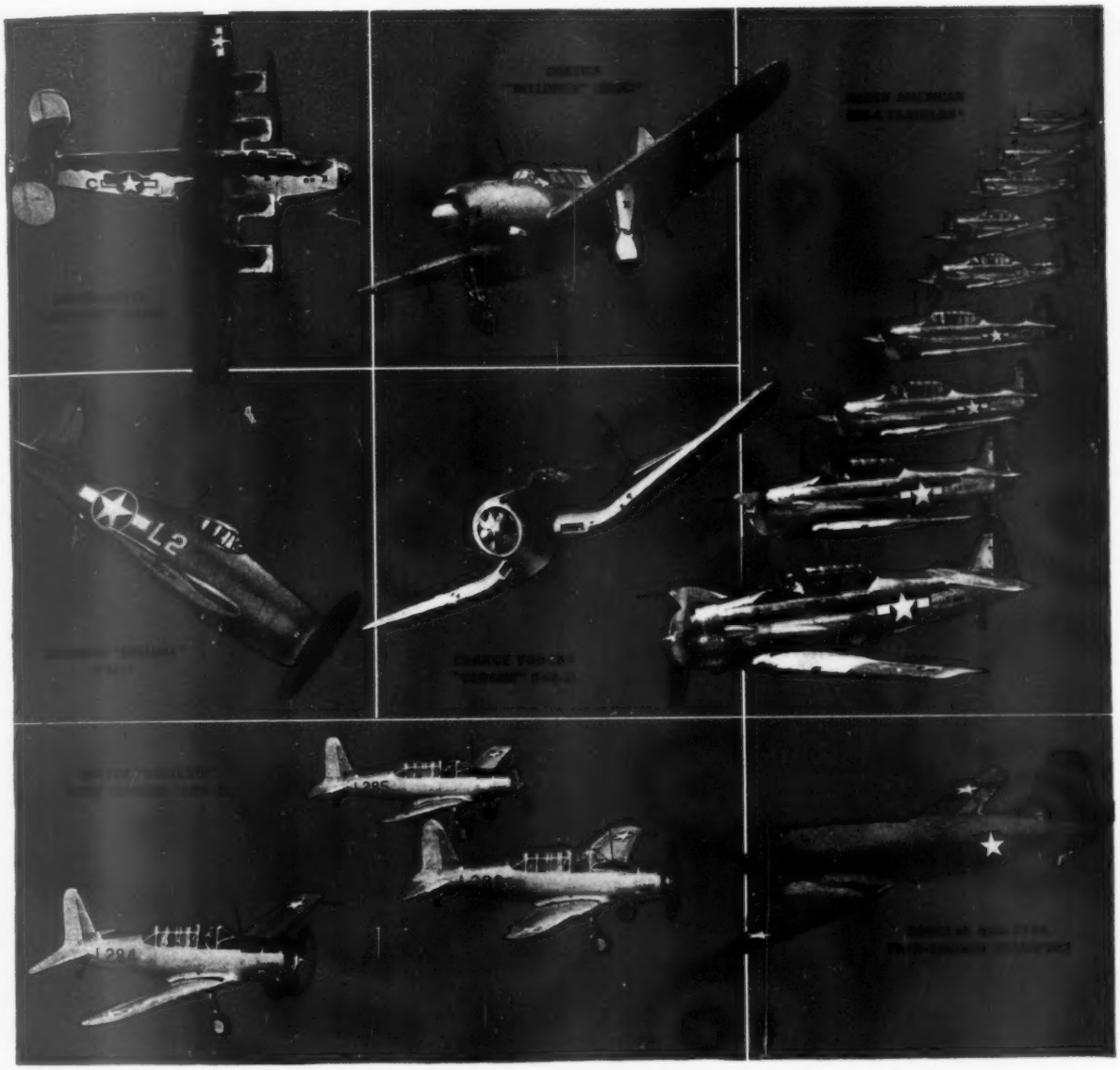
EDO AIRCRAFT CORPORATION, 414 SECOND STREET, COLLEGE POINT, N. Y., U.S.A.



*Official U. S. Navy Photos

The dramatic large photograph above of a Grumman "Avenger" (TBF) with warships of a mighty Task Force far below . . . en route to smash Kuajalein . . . symbolizes the overwhelming power of assault of the U. S. Navy and the vital importance of Naval Aviation to Victory.

★ ★ ★ ★ ★ ★ ★



From the early days of Naval Aviation, General Tire has been privileged to work with the Navy closely in the development of constantly improved tires and other aircraft products.

Main landing tires and tubes
Main landing wheels and brakes
Tail wheels
Tail wheel tires and tubes
Trailing antenna cone
Antenna tension unit
Crash pads
Cabin enclosure seals
Earphone cups
High altitude Oxygen Mask
Rings for goggles
Life belt (Mae West)
Parachute boat (one man raft)
Rubber stick control grips
Handle for wobble pump
Instrument board suspension units
Grommets for instrument panel
Suspension blocks for oil tanks
Landing light seal
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Packings and seals for hydraulic pumps, systems, etc.
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Bomb (500 lb.)
Grommets for firewall installation
Rubber wing walk treads
Master cylinder (brake operation)
Seals for retracting door openings
"O" rings for shock struts
Chevron packings—shock struts
Standard tubing and packing—air speed venturi
Grommets for control system cables
Seal for tail flight light

AVIATION DIVISION

THE GENERAL TIRE & RUBBER COMPANY — AKRON, OHIO

© 1944 The Studebaker Corporation

"Thanks a million for those fine engines!"

A FLYING Fortress pilot, on the last leg of his training before leaving for overseas, wrote this note to Studebaker:

"Thanks a million for those fine, high-speed Wright Cyclone engines. You keep building them. We'll keep them flying. Wish us good luck."

Today, all over the world, the good luck that bomber pilot asked for is smiling more and more on America's armed forces—thanks to their own resourcefulness and valor plus the unremitting thoroughness of the preparations of our Army and Navy general staffs.

With our government's wholehearted co-operation, the Studebaker organization, for example, has thus far built more than 45,000 Wright Cyclone engines for the Boeing Flying Fortress—more than 135,000 big, multiple-drive Studebaker military trucks—and the Army's new cargo carrier, the M-29 "Weasel."

But no one at Studebaker forgets for a moment that it's on the battle fronts, not the production fronts, that the war's outcome is decided.

And so Studebaker gratefully salutes the valiant men and women in our country's uniform as the Americans to whom the cause of freedom owes its biggest debt.

Awarded To All ARMY E NAVY *Studebaker Plants*

Always Ready!

Make the motto of the U. S. Coast Guard your motto. Be ready always with War Bonds. Buy them to help your country now—and to make your own future secure.

HOLD ON TO YOUR WAR BONDS!

Studebaker ***BUILDS WRIGHT CYCLONE ENGINES FOR THE BOEING FLYING FORTRESS***

Who Said
Fabric is
Fabric?
All airplane fabric may look alike but that's as far as it goes. Year after year more manufacturers buy more FLIGHTEX than any other airplane fabric because they know it's lighter, stronger, smoother fabric that surpasses U. S. Army and Navy specifications.
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SNYDER AIRCRAFT CORP., Chicago, Ill., Columbus, Ohio.
SUPPLY DIVISION, INC., Robertson, Mo., Memphis, Tenn.
THE AIRCRAFT STEEL & SUPPLY CO., Wichita & Kansas City, Kansas, Dallas, Texas.
VAN DUSEN AIRCRAFT SUPPLIES, Minneapolis, Minn., Waterloo, Iowa.

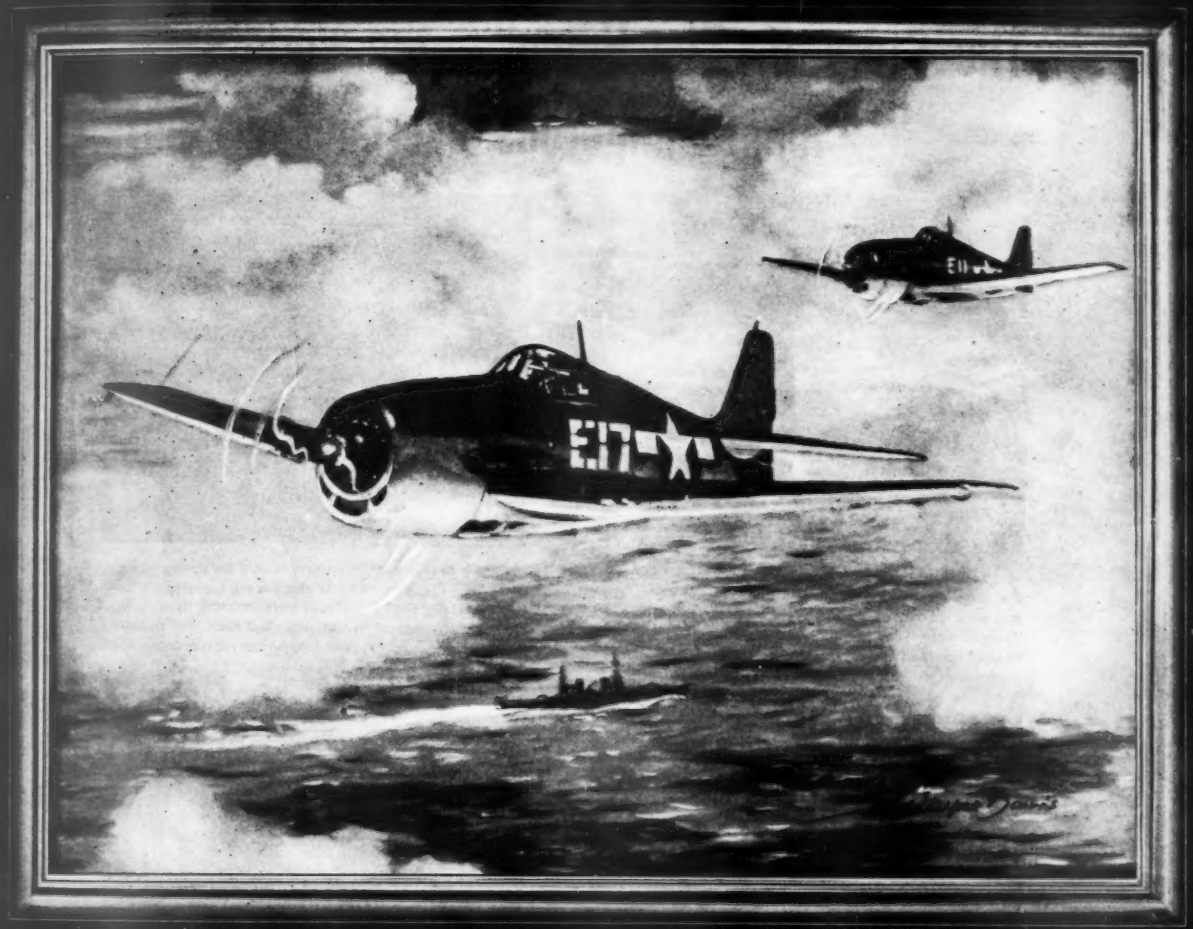
"Hello dear . . . I'm flying blind over Toledo. I'll be a little late for dinner."

. . . . TO KEEP YOU OUT OF TROUBLE

Two way radio communications for planes and helicopters are certain to be an actual necessity in the coming air age. Some day soon you can get radio equipment built by Hallicrafters to help keep you out of trouble in the air. Hallicrafters radio telephones for use in your own plane will become a reality just as soon as the demands of war production are relaxed. To keep pace with fast breaking developments in aviation, Hallicrafters will be ready with the highest quality, most dependable equipment you can get.

hallicrafters RADIO

THE HALLICRAFTERS COMPANY, MANUFACTURERS OF RADIO AND ELECTRONIC EQUIPMENT, CHICAGO 16, U.S.A.



U. S. Navy's Grumman Hellcats in Action off Saipan

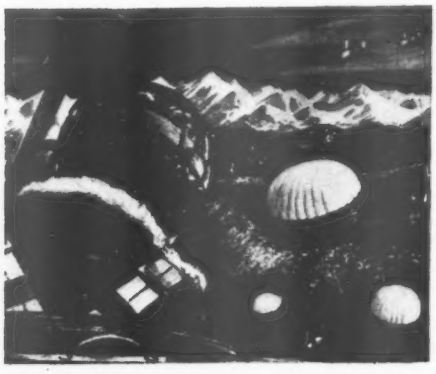
Grumman

AIRCRAFT ENGINEERING CORPORATION, Bethpage, L. I., N. Y.

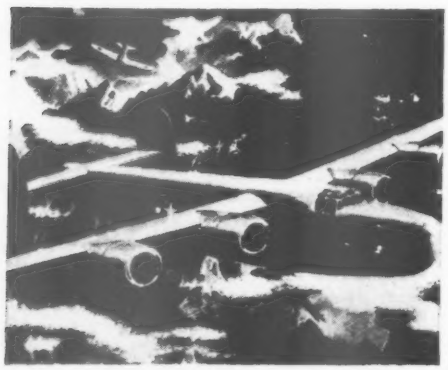
This advertisement is one of a series which is appearing in national magazines and newspapers as Consolidated Vultee's contribution toward a clearer public understanding of transportation's role in the war, and its postwar opportunities and responsibilities.

The Story of "The Hump"—the world's most dangerous overland air route

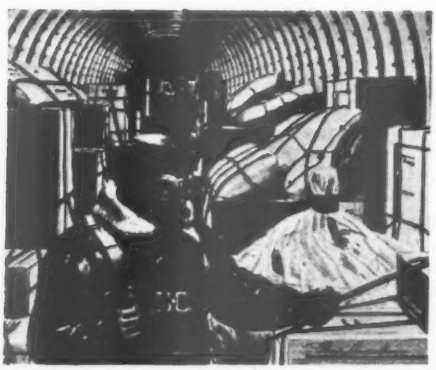
1. Today, American airmen are ferrying a greater tonnage of military supplies to hard-pressed China than was ever carried over the tortuous Burma Road. They're flying it over "The Hump"—the towering Himalayas between India and China. It's the most treacherous 500-mile air route in the world. *But the freight goes through!*



2. The first leg of the journey is over the steaming, foggy Assam jungles. Because there are no emergency landing fields, some of the planes have crashed. But most of the men who bail out eventually plod their way to safety, aided by rescue pilots, who drop written instructions, food, and medical supplies by parachute.



3. Day and night, the heavily loaded Liberator Express transport planes streak toward "The Hump." Shuttling across a tumbled mass of uncharted mountains, they dodge peaks that rise 20,000 feet. Icing is an ever-present hazard. Flying unarmed, the cargo planes are often attacked by Jap fighter planes. *Still the freight goes through!*



4. This slender aerial life line over "The Hump" is now the *only* channel by which Allied war equipment gets into China. Around the clock, in monsoon season and out, our flyers carry a constant stream of gasoline, bombs, jeeps, ammunition, artillery, small arms, clothing, aircraft engines and spare parts.

CONSOLIDATED VULTEE

5, many of our India-China flyers have been awarded decorations—and they've earned them! No one pretends that the supplies being flown in are sufficient to fully equip the Chinese. But the same ingenuity and courage that can conquer the lofty Himalayas will eventually open up new channels of transportation so that today's trickle of supplies will swell to an avalanche.

6, After the war, when all forms of transportation must work together to rebuild the peacetime world, the plane will continue to play its part, along with the truck, the train, and the ship. But the plane will have a second, and even greater, responsibility to fulfill: *that of helping to enforce the peace in this 60-hour-wide world.*

In short, a permanent postwar Air Force can be one of America's soundest investments in the interests of a lasting peace.

Quick Facts for Air-Minded Readers

Preview of the future—Last year, 6% of the dollar volume of all imports to the U. S. came by air—a total of 4,000,000 pounds.

Many of the air cargoes included mica, quartz crystals, industrial diamonds, and rare drugs, without which the production of vital war materials could not have continued.

Saving American lives—Litters for 8 wounded men can be fitted into the bomb bay of a Liberator bomber. The Army has already flown out several hundred thousand casualties from combat areas to hospitals.

9 tons per month—The Air Service Command reports that for every Air Force pilot based overseas, it sends out an average of 9 tons of aviation supplies monthly.

This does not include food and other items which are handled by the Quartermaster Corps.

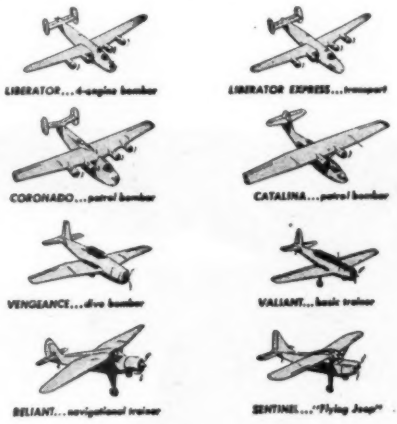
An airline is born—In order to expedite the flow of military personnel and equipment to the South Pacific, Consolidated Vultee operates a daily air-transport service known as Consairway.

A Liberator Express recently chalked up Consairway's 1000th transpacific flight.

Consolidated Vultee is the largest builder of airplanes in the world.

No spot on earth is more than 60 hours' flying time from your local airport

From "Flying Jeeps" to Leviathans of the air — *The planes shown below were all designed and developed by Consolidated Vultee. When peace comes, the company will be in a position to provide the postwar equivalent of such planes, from small, privately owned "air flivvers" to huge, transoceanic cargo-and-passenger planes.*

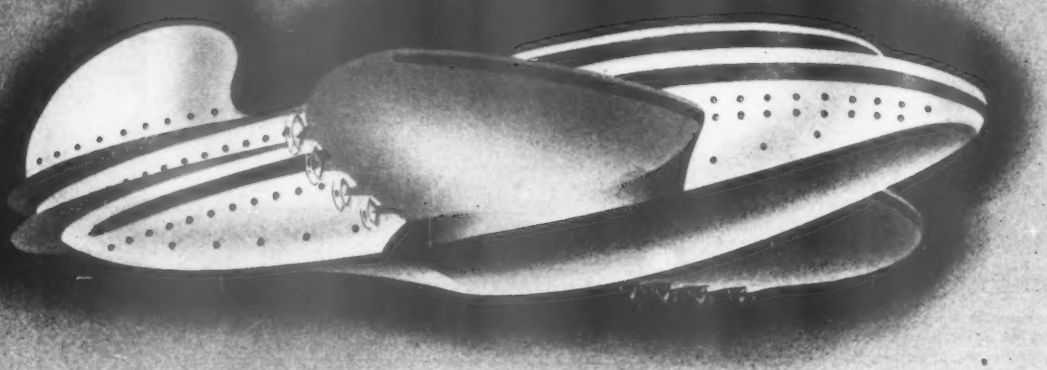


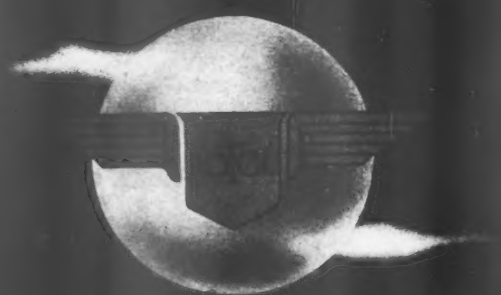
AIRCRAFT

San Diego, Calif. · Vultee Field, Calif. · Fairfield, Calif. · Tucson, Ariz. · Fort Worth, Texas · New Orleans, La. · Nashville, Tenn. · Louisville, Ky. · Wayne, Mich. · Dearborn, Mich. · Allentown, Pa. · Elizabeth City, N. C. · Miami, Fla.

Member, Aircraft War Production Council

IN A STARRY SPHERE OF PEACE





AIRCRAFT AND MARINE CRAFT PROPELLERS • AERO AUXILIARY EQUIPMENT

ROTOL LIMITED, GLOUCESTER, ENGLAND.

Canadian Representatives: BRITISH AEROPLANE ENGINES LIMITED, MONTREAL

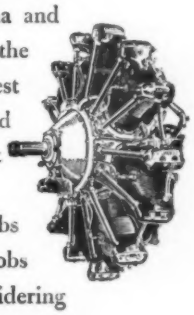
Jacobs has joined the Navy . . . twin-engine JRC's powered by Jacobs have been put into service by the U. S. Navy as light transports and utility ships. The Jacobs engines have been getting their indoctrination — and vice versa!

Brought up on the best, always snooty in its specifications, and convinced by experience that anything on, near or over salt water wears out faster, Navy conservatism looked leniently at "these Army jobs" . . . But we fully expect Jacobs conservatism to raise the Navy's sights.

THREE years ago, when bomber training got under way, the AAF rated the Jacobs used on twin-engine trainers as good for 350 hours between major overhauls . . . gradually extended the period up to as high as 1050 flight hours!

And we doubt that salt water and any Navy operation gives plane engines a worse beating than the Jacobs has taken under hard student handling, practice take-offs and landings, all kinds of field surfaces in all kinds of climates.

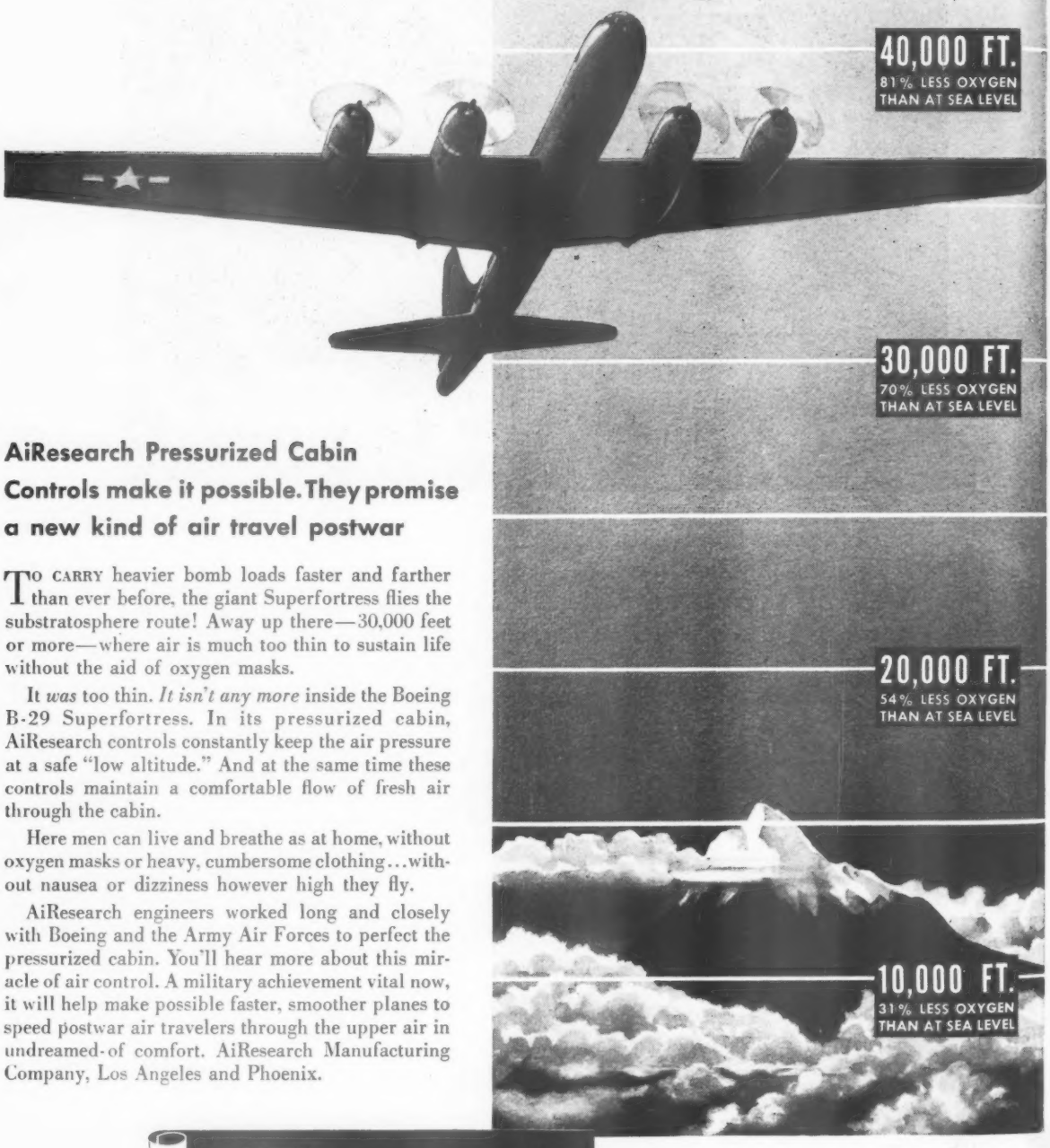
As the Jacobs adds days and knots to its Navy service . . . and hard-shell machinists mates find out about Jacobs stamina and performance . . . we are confident that the Jacobs engine will live up to the highest Navy specifications and traditions, add another creditable chapter to its past service records.



The more use and users the Jacobs gets, the more it will get! And Jacobs will have postwar engines worth considering as a *profit factor* in peacetime operations! . . . Inquiries invited . . . Jacobs Aircraft Engine Company, Pottstown, Pennsylvania.

JACOBS · **Pottstown, Pa.**

B-29 Crews Above 30,000 Feet Breathe *without oxygen masks*



AiResearch Pressurized Cabin Controls make it possible. They promise a new kind of air travel postwar

TO CARRY heavier bomb loads faster and farther than ever before, the giant Superfortress flies the substratosphere route! Away up there—30,000 feet or more—where air is much too thin to sustain life without the aid of oxygen masks.

It *was* too thin. *It isn't any more* inside the Boeing B-29 Superfortress. In its pressurized cabin, AiResearch controls constantly keep the air pressure at a safe "low altitude." And at the same time these controls maintain a comfortable flow of fresh air through the cabin.

Here men can live and breathe as at home, without oxygen masks or heavy, cumbersome clothing...without nausea or dizziness however high they fly.

AiResearch engineers worked long and closely with Boeing and the Army Air Forces to perfect the pressurized cabin. You'll hear more about this miracle of air control. A military achievement vital now, it will help make possible faster, smoother planes to speed postwar air travelers through the upper air in undreamed-of comfort. AiResearch Manufacturing Company, Los Angeles and Phoenix.

ARMY E NAVY

AiResearch
DIVISION OF
THE GARRETT CORPORATION

Superfortresses carry AiResearch Cabin Pressure Regulating Systems • Engine Oil Cooling Systems Engine Air Intercooling Systems • Supercharger Aftercooling Systems • Automatic Exit Flap Control Systems • Temperature Control Systems

If it's Rubber, Metal or Plastic *Check* Firestone *First*

OUR greatly expanded manufacturing facilities place us in a position to meet rigid production requirements for aircraft parts, such as: Tires, wings, pilot and bombardier seats, bullet-sealing fuel cells, seat pads, parachute rafts, shatter-proof high-altitude oxygen cylinders, landing gear and many other products of rubber, metal or plastic.

The new Firestone Aircraft Engineering and Products Data Book is now available to executives of the aircraft industry. If you do not have a copy, write Firestone Aircraft Company, Akron, Ohio, or Los Angeles, California, today. It will show you the diversified production facilities available to you.

Listen to the Voice of Firestone with Richard Crooks and the Firestone Symphony Orchestra, every Monday evening over N.B.C.

Copyright, 1944, The Firestone Tire & Rubber Co.

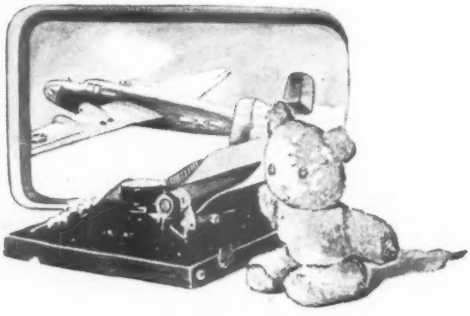
SHIP BY AIR

Firestone
AIRCRAFT COMPANY

They wouldn't fly without them...

A white kitten was the mascot of a troop carrier plane in the New Guinea area. She gamboled around the plane, quite at home, 10,000 feet above the Pacific.

Speaking of animals—a famous war correspondent always carried a little brown teddy bear whenever he traveled by plane.



A waist gunner on one of our four-engined bombers claims it's a locket containing a few ringlets of his wife's blonde hair that always brings him back safe and sound.

Ethyl antiknock fluid goes along with fighting planes powered by U.S. made gasoline. *It goes into practically every gallon of fighting grade aviation fuel*—which is one reason why our fliers not only have the best gasoline but plenty of it.

ETHYL CORPORATION
Chrysler Building, New York City

ETHYL
BRAND OF ANTIKNOCK COMPOUND
ETHYL CORPORATION
TRADE MARKS REG. U.S. PAT. OFF.

ETHYL is a *trade mark* name

POWER TO WIN

It would be very difficult, indeed, to find a fighting American pilot whose primary training was not acquired with Continental Red Seal Engines.

One good reason why is that Continental made the first commercial engines for smaller aircraft. In fact, Continental pioneered the light aircraft industry and is largely responsible for the success of that industry.

Naturally, this outstanding record is a matter of pride, but it is also a reminder of how these famous Red Seal Engines will perform for civilization after the war.

Continental Motors Corporation
Aircraft Engine Division
MUSKEGON, MICHIGAN

YOUR DOLLARS ARE POWER, TOO! BUY WAR BONDS AND KEEP THEM.

ARMY E NAVY

Awarded to the Detroit and Muskegon Plants of Continental Motors for High Achievement.

Look what the *Martin Mars* has done to Main Street!

PYRAMIDS and pagodas, the Tower of London and the Taj Mahal ... yesterday, these were the dreams of armchair travellers. Today, they're just across the way!

To you, Mr. and Mrs. America, the giant Martin Mars means swift luxurious travel . . . an opportunity to see at last the distant lands of romance. To American business these great flying boats mean more. By speeding cargo to or from any spot on the globe in three days or less, Mars-type transports will assure fast delivery of U. S. products . . . quick availability of U. S. technical knowledge . . . reduced inventories for foreign distributors . . . prompt repair service on exported items . . . and swift shipment of perishable goods. All this at a fraction of present ton-mile costs!

The Plane of Tomorrow . . . Flying Today!

Airminded Americans know that the 72-ton Martin Mars is the world's largest flying boat . . . that she's now in regular trans-Pacific service, speeding men and supplies to far-flung naval bases . . . that she's the prototype of 20 larger 82-ton giants being built by Martin for the Navy . . . and that she's the most efficient airplane yet built, per pound of material used, per horsepower, per gallon of fuel.

But the Mars is far more. She's the transport of tomorrow, flying today! In commercial versions of the Mars, postwar airline operators will have no visionary, untried design. Instead, they will have a successful type, thoroughly tested in overocean transportation. Production lines for Mars transports will, at war's end, be completely tooled and manned by experienced workers, eliminating conversion delays. If the aviation industry can set aside reserves for postwar construction and employment, Main Street will encircle the globe, thanks to Martin Mars transports!

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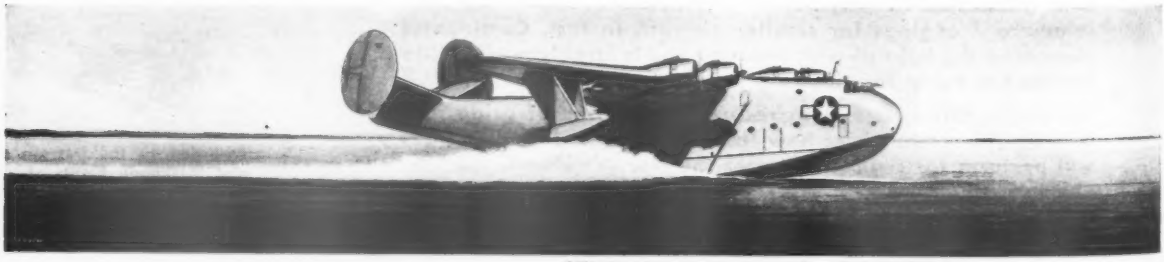

I PREDICT...

by Morris Sanders

Industrial Designer of New York

The kitchen of tomorrow will have no taint of the drudgery that characterized it in the past. A symbol of its efficiency will be the new refrigerators you will buy with your War Bonds. I have designs in my files for a horizontal, counter-height refrigerator that enables the housewife to see its entire contents without wearisome stooping. It has multiple compartments with varying degrees of temperature from "deep freeze" to "cool", and a special "private" compartment for ice cubes. There will be no wholesale release of cold air every time the refrigerator door opens, consequently it will be more economical. Furthermore, its cubic area will allow for more actual storage space than in the past

* * *

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FREE: *Write on company letterhead for "Seeds Of Industry"—a history of The Weatherhead Company its many facilities and diversified products.*

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You don't have to translate the language of a Mustang's 50 calibre guns or the 75 millimeter cannon talk of a Mitchell bomber. The Japs already understand. So do the Nazis. So let's keep talking. You bet you can help! Think of it this way. The Bonds you buy help build these fast-talking planes. The waste fat you collect helps arm them. Waste paper helps ship them, and gasoline flies them. Wouldn't you like to say a few words of this kind of "peace talk," too?

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ROMEC PUMP COMPANY • ELYRIA, OHIO, U. S. A.

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Buy War Bonds!

OLDSMOBILE DIVISION OF GENERAL MOTORS

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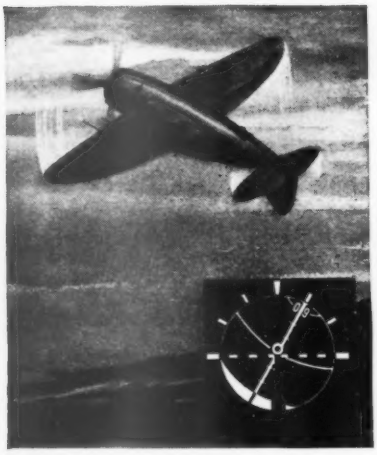
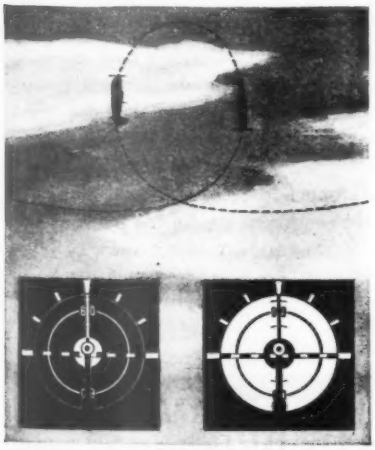
Pattern indication gives the pilot a visual "picture" of his attitude at all times, regardless of the degree of bank, climb, or dive.



No angular limitations! The Sperry Attitude Gyro indicates pitch and bank without any angular limitations!



No caging! Because there are no angular limitations, the instrument *never* has to be caged . . . not even in acrobatics!

Attitude Unlimited!

New Sperry Attitude Gyro provides pattern indication . . . has no angular limits . . . needs no caging!

WITH THE NEW Sperry Attitude Gyro Indicator a pilot can, *for the first time,* loop, roll, dive, climb, or fly at any angle with visibility zero, and still always know the attitude of his plane relative to the earth.

The spherical dial is marked to provide the same "pattern" type of indication whether by daylight or by any artificial light . . . a single glance tells the story.

The suspension for the spherical dial of this new Sperry instrument allows full 360° freedom of indication in the roll and pitch axes of the airplane.

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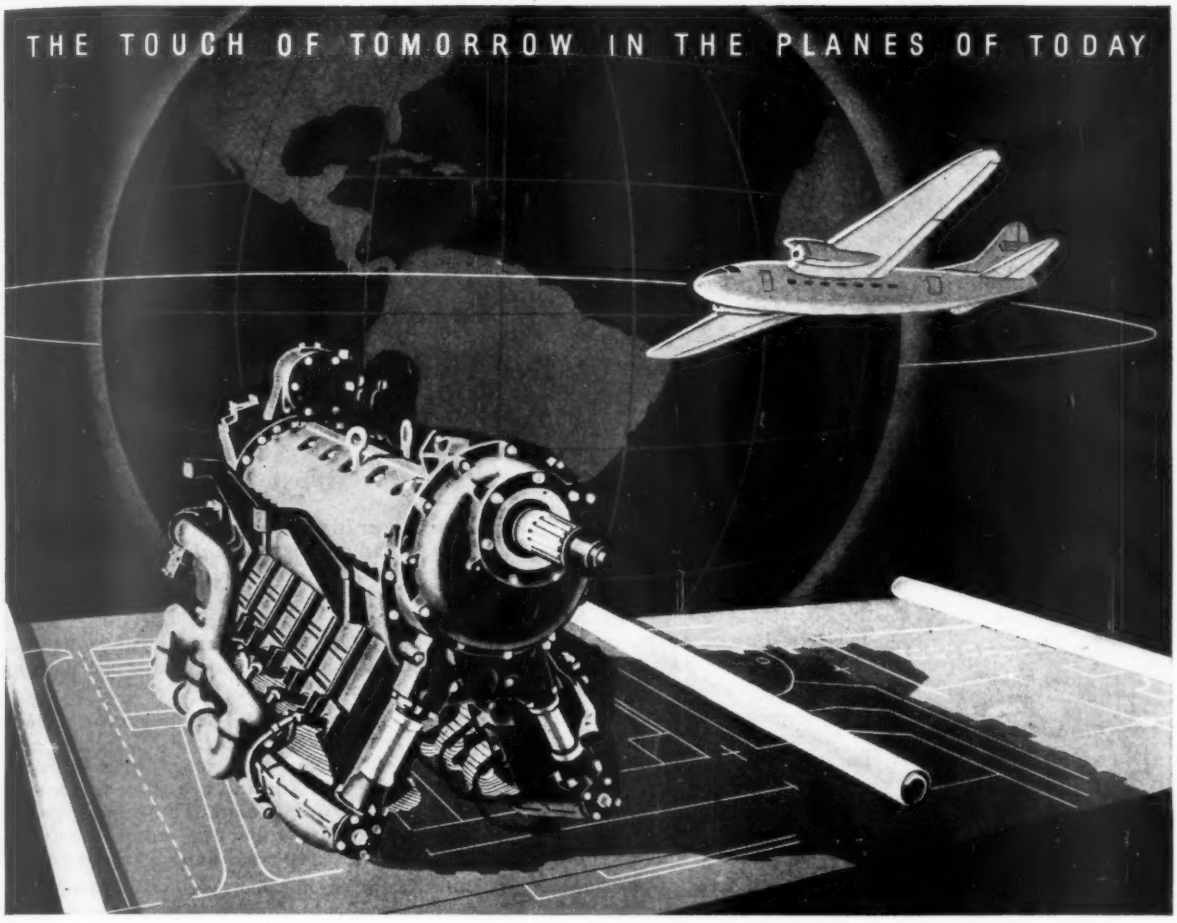

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Fairchild research—the constant quest for better materials, better methods, better results—has made this Ranger bonus possible. It springs from Fairchild engineering knowledge and experience that lends the "touch of tomorrow to the planes of today"

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INTRODUCTION

By ARTEMUS L. GATES

Assistant Secretary of the Navy for Air

THIS issue of FLYING chronicles the great year in the history of Naval aviation, the year in which we have turned the corner and caught first sight of distant victory. When I wrote a preface to last year's Naval aviation issue, Japan still extended her sway over the greater part of the western Pacific. Her borders extended down into the Solomons and eastward to the Gilberts; inside this vast area her shipping and commerce were, save for the activities of our submarines, virtually unchallenged. Our new carrier Navy was still undelivered and there had been no major Naval action since the sea battle in the Solomons in the autumn of 1942.

What tremendous changes have been wrought since then! They began on the first of September, 1943, when our first three new carriers, the *Essex, Yorktown,* and *Independence,* were blooded in a test raid on the island of Marcus. Other raids followed until, in November, 1943, Admiral Nimitz and Admiral Spruance threw their aerial and amphibious forces against the Gilbert Island chain. The heroic epic of Tarawa resulted, and in 10 days our Fleet could depart with a new conquest secured. Against Kwajalein in the Marshalls the pattern was repeated in January, 1944.

Since then, the forward progress of American forces has been steady and inexorable. Carrier task forces, the new weapon of a new Navy, raided one Japanese island stronghold after another. Truk, the enemy's dreaded strong point, and Palau, Saipan and many other islands felt their sting. We landed only when necessary to win bases; islands we did not need have been neutralized. Landings by General MacArthur's forces at Hollandia, in Dutch New Guinea, were covered by the hard-hitting planes of Task Force 58, under the competent hand of Vice Adm. Marc A. Mitscher. Now his force has opened the door that let in U.S. Army soldiers and Marines for the conquest of the Marianas. In doing so it demonstrated its invincibility by destroying almost to the last plane 400 enemy carrier aircraft which thought to destroy it, then turned around and put a severely damaged enemy fleet to rout. In the central Pacific waters, our power is undisputed. The enemy has lost over 2,000 planes to our carrier planes alone since August, 1943, and our combat losses, painful as is each one, have been less than 350. At this writing, the Imperial Navy is in hiding, the bulk of its carrier air power apparently destroyed.

This last year, therefore, has been our greatest offensive, and it brings into a clear light several inescapable conclusions about Naval aviation. The Naval plane *is* the Navy just as much as a 16-inch gun. It is part of its striking force. Naval aircraft constitute pure sea power in the sense that they can attack a hostile fleet and must be present to defend our own from hostile planes. They are a *strategic* air force, searching and bombing areas far ahead of the Fleet. They are a *tactical* air force; knocking out enemy air power in advance of landing and then furnishing close-range bombing and strafing support of our troops as they hit the beaches. Naval aviation must be a large permanent part of our defense establishment and must maintain itself at the forefront by constant experimentation and development during the days of peace.

The articles in this issue tell the stories of the gallant men in the air and on the ground who have made our victorious progress possible. To them we owe the obligation of carrying the task forward to a successful conclusion. We must not allow ourselves to believe for one moment that the struggle is over. The Japanese and Germans, too, once thought they had won. The Japanese have given every indication that they will fight to the last man; at this writing we are still some 1,300 miles from the enemy homeland. Every delay, every slackening in our effort at home, can bring disaster and cost of lives. We cannot afford to run out of bombs in the midst of an attack. We cannot afford to have someone's son fly an old, battered aircraft for lack of a new replacement. Let us try to retain, because we must, the sense of urgency and sacrifice which will bring eventual complete victory.

This Issue . . .

IN this special issue of FLYING magazine an attempt has been made to describe, in words and pictures, Naval aviation's activities during the past year and a half. Needless to say, it was not possible to cover this wide field with complete thoroughness. Countless exploits of individuals, squadrons, and ships have not been included for lack of space, and security has veiled such things as detection devices, new engineering and armament developments, and some of the fine work in anti-submarine warfare.

All the articles in this magazine were prepared in the Aviation Training Division from material submitted by various officers and men of the Navy, Marine Corps, and Coast Guard. The photographs were taken largely by officers of the division. Because of the time required to make up such an issue, recent spectacular successes of Task Force 58 in the Marianas, at Guam, at Rota and elsewhere are not presented in detail. This is particularly unfortunate because these battles so clearly illustrate Naval aviation's rapidly mounting power. Between the Marianas and the Philippines from June 10 to 23, for example, planes of the U. S. Navy, operating in connection with the invasion of Saipan, destroyed 747 Japanese aircraft, 30 ships and 13 barges, with negligible losses. Air Group 2 accounted for 177 shot down during this period, another air group accounted for 65 of Emperor Hirohito's vanished planes, and Lieut. *(jg)* Alexander Vraciu knocked down six dive bombers in one day, for an all-time high. Other units and individuals established similar brilliant records.

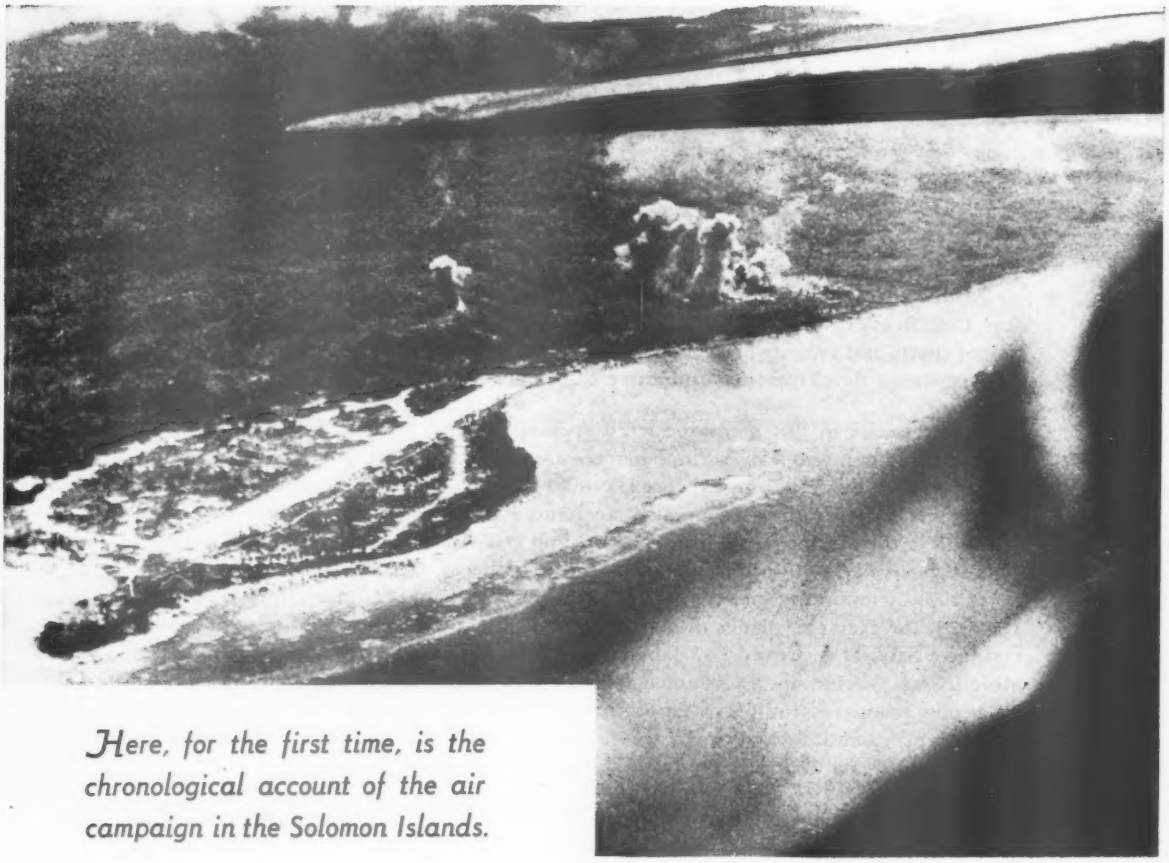
Perhaps the best insight into the accomplishments of Naval aviation are the combat statistics of the war to date. Since Pearl Harbor the Navy has shot out of the air and destroyed on the ground 6,259 Japanese aircraft and lost 1,277. This represents a favorable ratio of 4.8 to one and includes the long dark period of the early war when we fought against heavy numerical odds. The figures, moreover, do not take into account the many enemy planes downed by our antiaircraft fire.

These heartening statistics indicate not only physical expansion in Naval air power but a constant growth in our ability to use the plane as part of the Navy's striking force. Strategic and tactical knowledge has been gained and put into use on all the oceans of the world. Between the landing on Guadalcanal and the one on Guam, enormous strides were made in method and equipment. Close support of advancing ground troops by carrier and land based fighters and dive bombers is among the most important of these recent tactical developments.

As our forces move closer and closer to Japan this activity and others of Naval aviation will be of especial significance in winning the final victory. The far-sighted stressing of aviation has made the U. S. Navy the most powerful in the world today. Keeping this combination of Naval air and surface craft intact will provide one of the greatest keys to maintaining the peace in the post-war world.

The Editors

CAMPAIGN BY AIR



Here, for the first time, is the chronological account of the air campaign in the Solomon Islands.

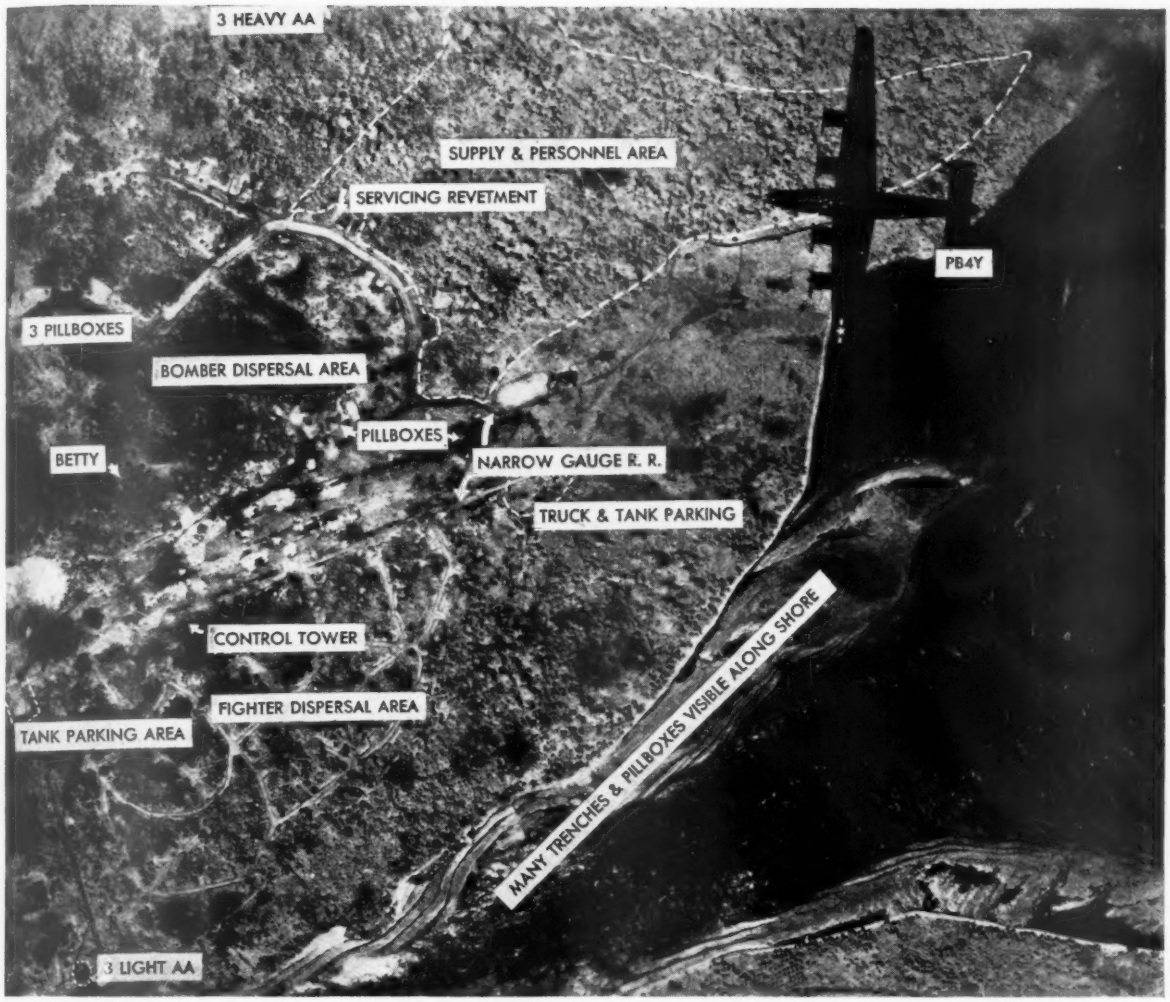
Mission accomplished, Navy planes leave only clouds of smoke and debris where Jap AA guns on Munda once belched deadly flak.

NAVAL aviation's war in the Pacific has fallen into two general divisions, one fought from land bases in the Solomons and the other fought from carriers operating across the Central Pacific toward the west. In the public mind these divisions may naturally be a bit confused. Some of this confusion derives from the system of issuing communiques. For the most part, General MacArthur, as supreme commander of the South Pacific area, has been authorized to issue communiques datelined "Southwest Pacific" and covering both his campaign on New Guinea and Admiral Halsey's campaign in the Solomons.

But these two theaters have fought independent wars for the most part. General MacArthur has been preoccupied almost entirely with the entrenched Japanese on the island of New Guinea, and Admiral Halsey and his staff of Navy, Army, Marine, and New Zealand commanding officers have directed the successful struggle for the Solomons. That campaign may now, with the neutralization of Rabaul and landings on New Britain, be described as completed. The seizure of Green Island, the northernmost atoll of the Solomons, completed our occupancy or neutralization of the long Solomon chain. It has been one of the most interesting and one of the least publicized operations of the entire war. Most people are aware that the Marines performed miracles against heavy opposition on Guadalcanal, but many are uninformed about the military steps preceding and following that bloody fight.

Naval and Marine Corps aviation played leading roles in the Solomons war. Operating from land bases instead of carriers, the fighters, the dive and torpedo bombers, and the patrol and search planes of the Navy were in constant service from the first thrust into the Solomons until the last Jap planes were downed over Rabaul. Some of the most impressive aviation records of the war were established in this advance up the South Pacific. The Navy's land-based fighting *Corsairs* knocked down 154 Japs in nine weeks of duty in the Solomons with a loss of only 13 planes. Other Navy and Marine squadrons made similarly fine records. During last January, as the fighting was drawing to a furious climax, Allied planes under Admiral Halsey's command shot down 500 planes over Rabaul alone. This wholesale destruction of enemy air power in the Solomons is possibly the greatest single factor in the Japs' present impotent condition. It was accomplished in a long campaign that called for masterly strategic and tactical planning.

At the beginning of the South Pacific war the Japs were well established on most of the Solomon Islands and on New Britain and New Ireland. In the early months of 1942 our most northerly foothold in this area was Noumea, near the southern tip of New Caledonia, which lies below the Solomon chain and is owned by the French. When, shortly after Midway, the Japs began moving down to Guadalcanal from their big bases at Rabaul and Kavieng to establish an airfield, we quickly moved up to Espiritu Santo, in the New Hebrides. This northward jump of several hundred miles was not difficult; it was accomplished with no opposition on land and against only desultory Jap bombing raids. We landed Marines and Seabees and rapidly had several air strips in working order.



Initial damage inflicted on Jap installations at Buka airfield is indicated in this photo taken after a carrier task force raid in November, 1943. The annotations, made by intelligence officers, eventually led to even more devastating sorties against the base.

Both sides were making vigorous and hurried preparations for the forthcoming battle of the Solomons. The Japs, needless to say, were in much the better position. While we held only a base or two below the main Solomon chain, far removed from our Pacific supply depots, the Japs were well dug in on virtually all of the big islands of the group. In addition, they held New Britain, New Ireland and other important bases to the north. Their supply line was firmly intact; ours was exceedingly shaky.

The Solomons lie in two parallel lines, roughly in a north-south direction. At the south end of the chain is the big island of Guadalcanal, which was obviously a key position for advances to the north. Forming the line to the west are such islands as the New Georgia and Treasury groups. In the line to the east are Choiseul and Santa Isabella. The important island on the north end is Bougainville. The space of ocean between these lines of islands became known familiarly to Allied fighters in the area as "the slot." A flight north in the Solomons was a flight "up the slot," or "up the line." Strategically the Solomons were vitally important, offering air control of all the southern Pacific waters. Naturally the Japs were anxious to maintain command over them.

Despite a grievous lack of sea and air power, U. S. forces smashed into Guadalcanal on August 7, 1942. The audacity of the move is most apparent when one considers that it was made only six months after Pearl Harbor, at a time when our war machine was in sad disrepair and that of the Japanese had

(*Continued on page* 310)

Ballale Island after softening by Naval air raids. Note damage to plane revetments along runways, especially in upper center.

THE CV CARRIERS

Airpower in an invasion. At least eight carriers, with their escorting vessels, transports and landing craft are visible here.

Thousand-plane raids today will become 5,000-plane raids in a few months as our carriers make the Pacific an Allied lake.

SUPERIOR carrier-based airpower made the Pacific an Allied lake in 1944. The Japanese Navy was sent crashing back into its home harbors with its "Maginot Line" of island defenses smashed. This sea blitz which started late in 1942 is proceeding with ever-increasing fury.

"Thousand-plane" raids on enemy positions, by planes flown from carriers, are becoming the rule rather than the exception in our major offensives. Rear Adm. A. W. Radford said early in 1944, "It is no exaggeration to say that today the Navy is capable of striking with 1,000 carrier-based planes—and more than 1,000 planes if necessary—at almost any spot in the Pacific."

And while these tremendous concentrations of air strength from sea-going landing fields are already an actuality, Naval airmen look forward, conservatively, to a future not more than a few months away when it will be possible to unleash the striking power of more than 5,000 planes from carrier decks on any chosen spot.

Emphasis on the role of the aircraft carrier in sweeping the enemy fleet from the Pacific does not minimize the role of other forces and weapons. The carrier was the key weapon, however, playing the same role in the lightning Pacific sea-war that the armored division and the dive bomber did in Germany's drive over European defenses from 1939 to 1941.

Without the superior mobile air power at our command, Japan's chain of Pacific island air bases, backed by her fairly intact battle fleet, might have prolonged indefinitely and increased vastly the cost of smashing even her outer defenses.

Japan's only chance for victory was to stay on the offensive until she had overrun every base from which the Allies might launch a counteroffensive. She was forced into defensive action only because her own carrier fleet was heavily damaged in the Coral Sea and at Midway.

America also lost most of her own carrier striking power in those early engagements but the final tally showed that the Allies still held the essential bases for counterattack and had the sea power and land-based air power to defend them. Carrier planes, incidentally, formed a part of that land-based air power during the critical period. In the 10 months following the Battle of Santa Cruz many "carrier pilots" began and finished their war-zone experience flying from the bomb-scarred fields of the Solomons.

A seeming stalemate followed the carrier battles of 1942, but *Japan had lost the war.* It had lost because America's capacity to produce carriers and aircraft and her skill in training airmen was superior, thanks to far-sighted Naval planning and legislative co-operation.

There was comparatively little combat in the Pacific involving the use of our first-line carriers early in 1943, though planes of the *Enterprise*—the "big E"—took part in the sharp Spring fighting in the Solomons, together with planes from smaller carriers. For most of our big combat carriers, however, this was largely a time of preparation for the days to come. Newcomers were being commissioned and going through the shakedown period.

This time of waiting for the big carriers was one in which the "baby flat-top," or escort carrier, came into its own. The CVE's were brought to public notice through their coverage of the North African landings of November, 1942, along with the *Ranger*. The first dramatic air feat performed "on their own," however, occurred when airmen from an escort carrier were assigned to cover the landings on Attu in May, 1943.

At times during the first stages of the Attu invasion, the *Wildcat* fighters from this carrier, commanded by Capt. A. K. Doyle, provided the only air cover. With land-based planes pinned to their bases by fog, fighters from the baby flat-top—lying close in to the Jap-held island—would take off, fly over the fog until they could see a Jap position through a break, then slash in to strafe or bomb in support of ground troops. When Jap barges used the fog cover to try to cut off the rear of newly landed Americans, the .50-caliber machine guns of the *Wildcats* sank the barges and mowed down the Japs who manned them. Most of the pilots who braved Jap antiaircraft fire, the fog, and the treacherous Aleutian williwaw had no previous combat experience.

In the Atlantic, the baby carriers were to prove the decisive factor in winning the most important Naval battle of 1943—the battle against the U-boat. Surface craft and land-based air power had proved effective in protecting convoys in areas where they could operate together, but a 600-mile strip of sea in the mid-Atlantic was proving a happy hunting ground for U-boat wolf packs. The baby carriers took air cover to this mid-Atlantic strip. Not content with mere convoy protection, the Navy also sent task forces of baby carriers and light war vessels to seek out the wolf packs. The team proved brilliantly successful. In one period of 1943 in which 29 submarines were sunk, 26 were sunk by planes; and of these, 21 were Navy planes, some from carriers and others shore-based.

On one voyage in the spring of 1943 a carrier made a series of 11 attacks, chalking up two submarines sunk, four more "very probably sunk," and four more "probably sunk." In November of 1943, the U.S.S. *Card*, commanded by Capt. A. J. Isbell, was given a Presidential citation, along with its task group, for its work in anti-submarine operations.

As the summer of 1943 waned, the storm that was to break the Japanese outer defenses gathered. New and remodeled battleships joined the fleet along with new carriers. These formed teams that were virtually invulnerable and had the power to move in and hammer down Jap shore fortifications.

They struck first against Marcus Island, only 1,000 miles from Japan. Three new carriers, two *Essex*-class carriers and one of the cruiser-converted *Independence* class, wrecked 80 per cent of the buildings and emplacements on that island, reducing it to a shambles for the second time in this war.

Less than three weeks later, on September 18, three carriers —all getting their first taste of action—hit Tarawa, Makin, and Apamama in the Gilbert Islands. They were one large carrier and two cruiser conversions.

The next American carrier blow was half way around the world. On October 4, 1943, the *Ranger* left her escort and patrol duty in the stormy Atlantic to sink 40,000 tons of German shipping off the coast of Norway. This ship, ironically, had been reported by Hitler as sunk months earlier. On October 5-6, six carriers were massed to give Wake Island the heaviest air pounding of the war thus far. Five of these carriers had one previous raid to their credit; the sixth, a CVL, saw its first action.

Comparative quiet of the next month was merely incidental to accumulation of new power for the next strikes. On November 1 and 2 the veteran *Saratoga*—"Old Indestructible"—and a new CVL joined forces to blast Buka and Bonis airfields on Bougainville in support of the Marine landings on that island.

With only a day's rest, these two were ordered to proceed at high speed to Rabaul, the great Jap port in the Southwest Pacific, and attack the enemy warships gathering there. On November 5 the carrier planes caught Jap cruisers massed in Rabaul harbor. Of six heavy cruisers, five were hit by bombs and the sixth by a torpedo. Two light cruisers were also hit and two destroyers sunk. Every cruiser in the harbor had been hit by bomb or torpedo, and the threat to the troops on the beachhead at Bougainville was eliminated. The 97 planes in the raid were commanded by Comdr. Howard Caldwell, a former Naval Academy football star.

The two carriers and their supporting forces then sailed into the waters near Truk in an attempt to lure the enemy out, then

The pay-off of carrier supremacy is shown here in wrecked and burning Jap planes on Tinian Island. Avenger at left of photo.

joined three others in the Armistice Day raid on Rabaul. Fifteen Japanese warships were sunk or damaged in this action, which effectively ended the use of Rabaul as a major Japanese shipping base.

One *Avenger* torpedo plane returned from the action with 109 bullet holes and another with 87.

The greatest Naval air blow of 1943 was struck in late November in support of the Gilbert invasion and the historic struggle for Tarawa.

For this operation Navy carrier forces were massed in "thousand-plane" strength the first time. Seagoing landing fields in unprecedented numbers converged on the Central Pacific to support the Gilberts landings. For one air group this operation was the ninth strike in 19 days.

Some of the great carrier fleet bombed and strafed in advance of the landings; other units neutralized nearby Jap airfields and bases; and still others were stationed to intercept Jap air reinforcements flying down from the northern Marshalls. The combat air patrol of one carrier knocked down 17 Japs in one day, and scored four probables at a cost of only one plane—and its pilot was rescued On the following day, outnumbered two to one, they got 12 Japs at cost of one plane.

Fighters from this same carrier, not satisfied with the damage they could inflict by strafing, dropped their gasoline-filled belly tanks on a large building to soak it with high-test fuel, then went back and set it on fire by strafing.

One escort carrier, the *Liscombe Bay*, was lost to enemy action in the Tarawa covering operation It was the first escort carrier lost in the war, the first carrier of any type lost since the Battle of Santa Cruz islands in October, 1942, and the only carrier lost during all of 1943.

The Japanese got a hint of what was coming in the Marshalls when those islands were blasted by a heavy carrier task force early in December. That ended major action for the year, although smaller forces stabbed at Nauru and at Kavieng, New Ireland, later in the month.

Toward the close of January, 1944, a great U.S. fleet, including a carrier force even larger than that which covered the Gilberts landing, started blasting the larger islands of Kwajalein atoll, the key to the western Marshalls. The Kwajalein

Hellcats of a fleet task force carrier warm up on deck for another strike against Jap atoll of Mili in the Marshall Islands.

Surrounded by Hellcats, ordnancemen work on bombs on hangar deck of carrier while officers and men in background watch a movie.

landings themselves were carried out *more than 500 miles from the nearest friendly land airfield, and within easy flying distance not only of the airfields under attack but also of the big Jap bases in the eastern Marshalls.* This operation, and the one immediately afterward at Eniwetok, advanced our land forces 900 miles along the road to Tokyo.

The Kawajalein and Eniwetok operations were an intensified version of the fighting in the Gilberts. The victories were made possible because carrier-based air power proved that it could successfully slug it out with land-based planes. In each case we used enough carrier aircraft to overwhelm the land-based planes which the Japs had on their small rocky islands in the Marshalls. These islands, Japan's "unsinkable aircraft carriers," proved the disadvantage of being immovable and they were churned into death-traps by shells from surface ships and bombs from the air—probably the heaviest concentrations of explosives in the history of warfare up to that time.

In the Gilbert and Marshall operations escort carriers figured prominently in providing close cover for the landing troops. The use of more small carriers in amphibious operations is now freeing the larger carriers for the strategically offensive operations for which they are best suited—the fast run with heavy-gun fleet units and the pulverizing blow at shipping and shore installations.

Even while many carrier planes were still helping with mopping up operations in the Marshalls, a fast carrier task force on February 16-17 hammered Truk atoll, more than 1,000 miles inside what was left of Japan's "unsinkable-carrier" front line. This "front line" now consists mainly of thousands of stranded troops cut off from their supply lines. In this first blow at Truk, more than 20 Jap ships were sunk, several more probably were sunk, and more than 200 enemy airplanes were destroyed. This heartening bagful cost us 17 planes and moderate damage to one ship. On the second day of the raid there was no enemy airborne opposition. The "unsinkable carriers" had been decommissioned.

The Truk attacking force then steamed boldly 500 miles northwest and pounded Saipan, Tinian and Guam in the Marianas, the action taking place on February 22. In the meantime, another task force was covering the Eniwetok landings of February 18 to 22.

While the newly won bases in the Marshalls were being consolidated, the far-reaching carrier arm hit again and again increasingly close to the heart of the Japanese empire.

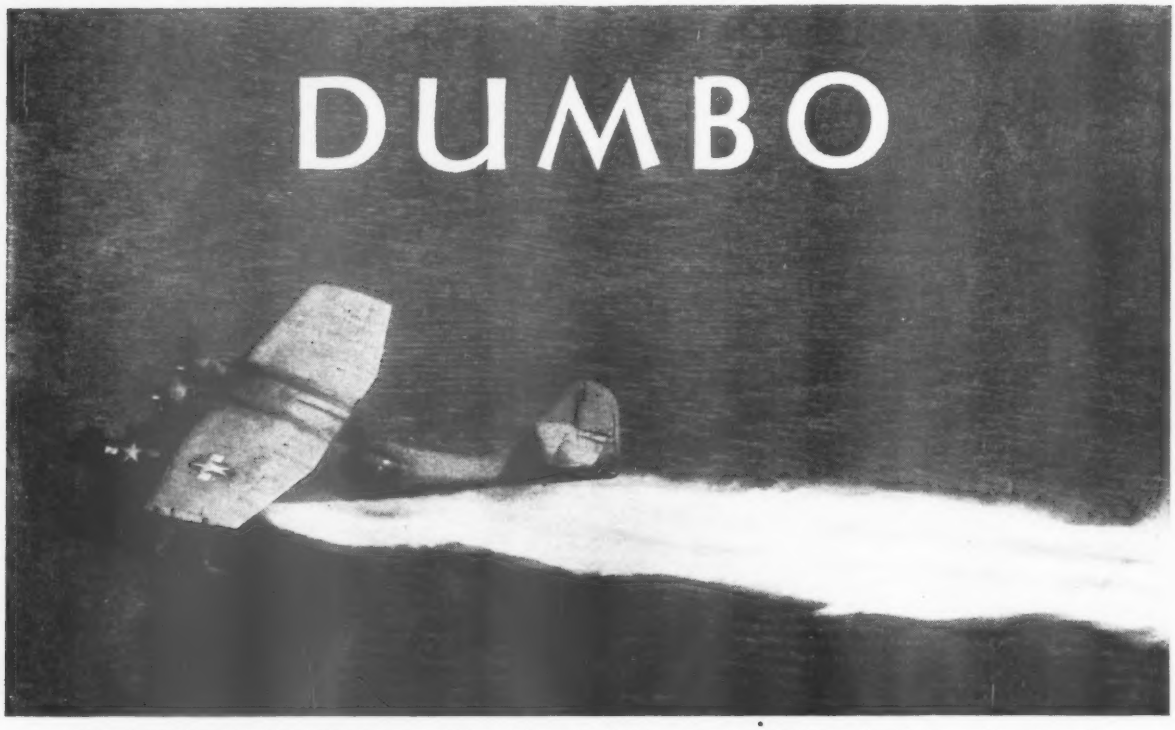
With Rabaul and Truk largely neutralized, a fast task force set out in March to blast Palau, a rival to Truk as a Jap "Pearl Harbor." Here were the administrative headquarters of all the Japanese mandated islands in the Pacific. In three days of attack with bombs, machine guns, torpedoes and rockets on the Palau group and at Yap and Woleai, this force sank 28 Japanese ships, damaged or forced the beaching of 18 more, and destroyed from 160 to 214 planes. Against this we lost 25 American planes and the lives of 18 flyers. Although major enemy warship units fled, cruisers and destroyers were included in the list of ships sunk and the raid effectively neutralized Palau as a supply point for aid to the beleagured Jap positions in New Guinea, marked for the next big strike.

The Palau raid, probing as it did to within 500 miles of the Philippines, was conclusive proof that America controlled the Pacific. This control was based on carrier air supremacy. Not a ship of the huge force which went to Palau was damaged in the long trip through waters that two months earlier were reported as being securely in the grip of the enemy. The Pacific picture, in other words, was reversed approximately seven months after the first big new carrier was ready for action.

In late April our carriers massed in the southwest Pacific to cover ground troops in taking Hollandia, the great Jap air center of north central New Guinea. Within three days against light opposition, the three key airfields of the Hollandia area were captured, giving the Allies a land air base 1,100 miles from the Philippines.

(*Continued on page* 298)

DUMBO



A Dumbo taking off on South Pacific rescue mission. After a big battle as many as 50 Catalinas have taken part in one search.

"Dumbo" is the Navy's affectionate name for Catalina search planes which have rescued hundreds of flyers.

TO DISNEY lovers, the word Dumbo means a little pink elephant. To Allied pilots in the South Pacific it means the difference between life and death. "If you get in trouble don't forget to call Dumbo"—that advice of the intelligence officer involves the greatest single morale factor in our air war against the Japs.

Dumbo is the Navy's pet name for the big lumbering PBY's, or Consolidated *Catalinas*, that are now doing the bulk of the rescue work in the Pacific. *Catalinas* have done just about everything so far in this war—patrolled the Aleutians, glide-bombed the enemy's ships and shore positions, lugged supplies in and out of hot areas, and even a bit of dog-fighting. Having thus established an all-time record for aerial versatility, they were the logical choice to take over the work of picking our downed pilots out of the sea and other troubled situations.

Even the best combat flyers sometimes find themselves in distress. Engines fail, planes get lost, the weather goes bad, gasoline runs out, and once in a while a Jap will get close enough to shoot at some American plane and hit another one. These unfortunate things keep happening in an area like the South Pacific. And since pilots are exceedingly valuable property, the Navy is desirous that as many as possible spend their time in airplanes and not in the ocean.

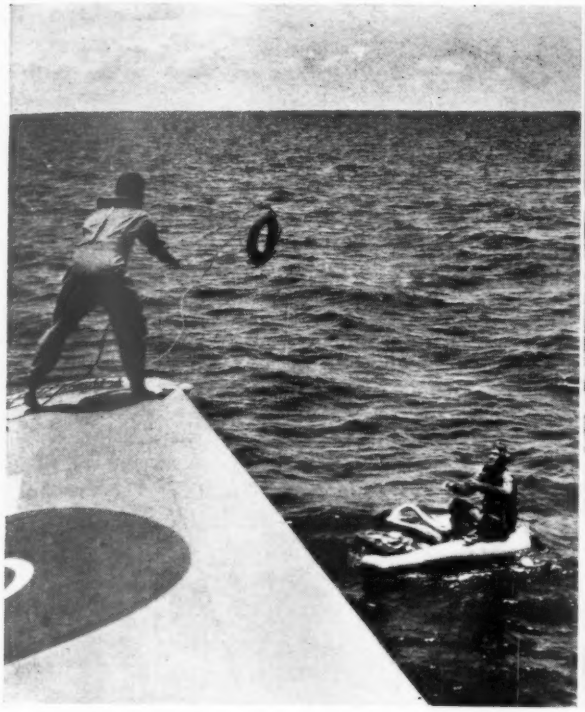
As the South Pacific war progressed, many different rescue devices were used. In the early days of Guadalcanal, the J2F-4 seaplanes, or *Ducks*, acted as the angels of mercy in rescue hops. But it became apparent that a two-seater airplane was not big enough to be effective in, say, a pick-up involving a stranded *Fortress* crew. So the roomy *Catalinas* began to take over. In the last four months of 1942 a handful of *Catalinas* were assigned to rescue work at Espiritu Santo and Tulagi, but in 1943 the job was organized on a more formal basis. It is safe to say that this Navy rescue operation now represents the most cheerful development of the whole Pacific war.

The name "Dumbo" sprang from the head of an anonymous operations officer who was unexpectedly called upon one day to think up a radio code name for some *Catalinas* bound on a rescue sortie. Although the radio code name is changed daily, the name stuck. Today in the Pacific, Dumbo is synonymous with life-saving in its most courageous form. When a *Catalina* man walks into the mess hall of fighter or bomber flyers a loud cry goes up, "Steak for the Dumbo pilot!" and if there is any steak available in the kitchen, the visitor will get it.

Any plans for a big strike include Dumbo. Sometime during the important night-before briefing a pilot will ask, "What about Dumbo?" and the intelligence officer will say something like, "There will be 12 Dumbos. If you get in trouble call quick. And don't paddle toward shore—the natives are unfriendly all along there. Just wait for Dumbo. You'll be picked up." By now all the pilots know that the chances are vastly in their favor that Dumbo *will* pick them up.

In a big melee like the strike against Rabaul, the Dumbos will rendezvous with the fighters and bombers and trail along to the combat area. Then, while the bombers are blasting the target and the fighters are working on Jap pursuit planes, the *Catalinas* slowly circle the perimeter of the fighting, looking for mishaps. For example, if one of our fighters should get an anti-aircraft hit in the engine and start down, Dumbo will follow it, through anti-aircraft fire, fighters and other assorted opposition. It may be that the pilot had time to call before bailing out. If he did, the call will come in roughly like this: "This is

(*Continued on page* 228)



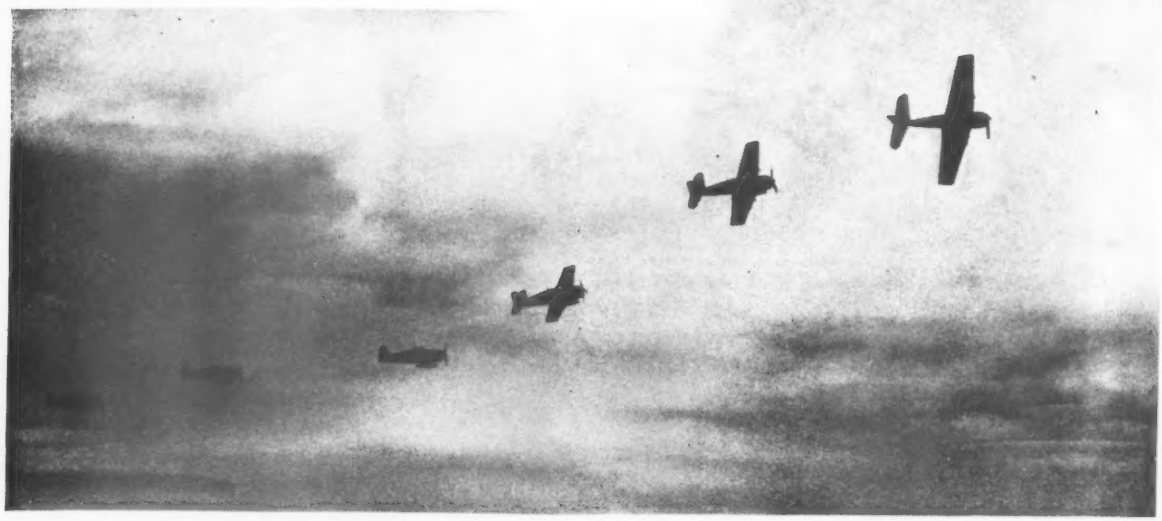
Pilot in one-man life raft raises arms to catch preserver being tossed to him by an officer on the wing of a New Zealand Dumbo.

Crew of New Zealand Dumbo assists stranded pilot through side blister of their Catalina after a dramatic rescue in Pacific.

Resting in after station of Catalina en route to base, this crew of Army Mitchell shot down over Rabaul has just been rescued.

THE VF FIGHTERS

Navy fighters have such superiority over the Jap they vie with each other for each kill.



This is how a strafing attack on a Jap base starts. These Hellcats would drop their belly tanks before attack.

DURING the first big raid on "impregnable" Truk, every enemy plane was shot down or disabled by U. S. Navy carrier fighters on the opening day. When the dive and torpedo bombers reached Truk on the second day they went about the business of beating up the shipping in the lagoon and the installations on land without any annoyance from the air.

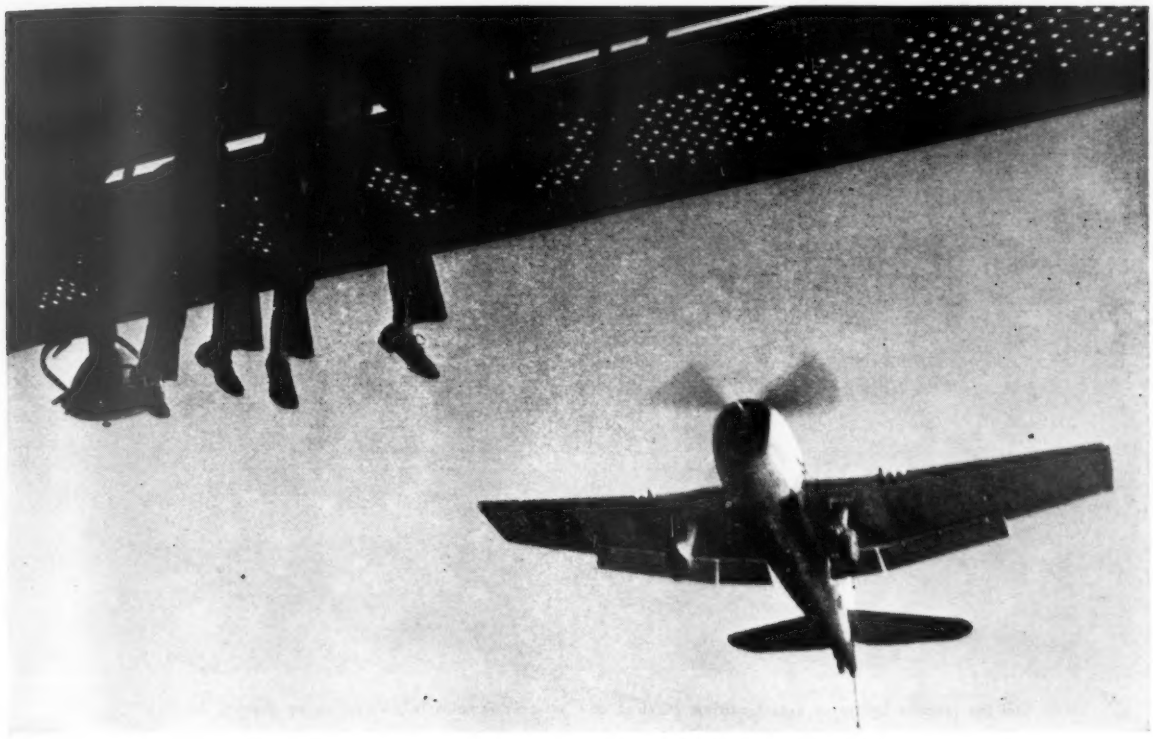
These facts have particular significance because they so ably demonstrate the improvement of our position in the Pacific during the past year and a half. In the first few disheartening months after Pearl Harbor, U. S. Navy and Marine fighter pilots struck back against such enormous odds that it seemed unlikely they could succeed. The advancing Jap had the benefit not only of vast numerical superiority but also of long combat experience. American pilots were few and untried.

Gaining experience, they halted the surprised enemy at Midway and then started on the long slow road toward Tokyo. Navy dive and torpedo bombers established new records in doggedness and gallantry; smashing a huge Jap fleet, and giving the nation time to arm. But their work, as it must always be in this kind of sea-air war, was made possible by the protective skill of fighter pilots.

Always outnumbered, this handful of fighters was largely responsible for saving the rest of our fleet after Pearl Harbor. One Navy ensign flying a Grumman *Wildcat* brought his plane back after an especially discouraging early scrap, when Zeros were clogging the air at a ratio of about 10 to one, and said to his squadron mates, "I hope to hell I'm around if we ever get to take a sock at those monkeys on an equal footing." Recently at Bougainville this pilot, now a lieutenant, was along on an early morning fighter sweep against Rabaul. The odds, he may have reflected, had changed considerably. The members of his squadron—the Navy's celebrated Skull-and-Crossbones, with an all-time record of 154 Japs to its credit—were in what might be described as a carnival humor. Fighter sweeps were the most pleasant of all fighter missions and the first streaks of dawn indicated that it was to be a fine day.

Circling Simpson Harbor, they noted that not much in the way of enemy air opposition was coming up to meet them. The Japs, sorely harried by weeks of shattering raids, were apparently staying on the ground to nurse their wounds. Then the *Corsairs* observed a commotion of some sort on one of the docks. Letting down a bit, they were able to make it out in some detail. A celebration was in progress; the Japs, with typical pomp and formality, were welcoming a party of dignitaries who had just arrived on a cruiser.

The Skull-and-Crossbones lit in the middle of this happy outing like dispossessed hornets. They came roaring in over the water at zero feet and began spraying the party with .50-caliber bullets. The dignitaries hit the harbor from every angle. The welcoming group, following suit, threw their flags and musical instruments into the air and dived for cover. According to a Navy pilot, one man who seemed to be a key



Carrier crewmen sit on gun gallery catwalk as a Hellcat comes in for landing. Picture was made from hangar deck.

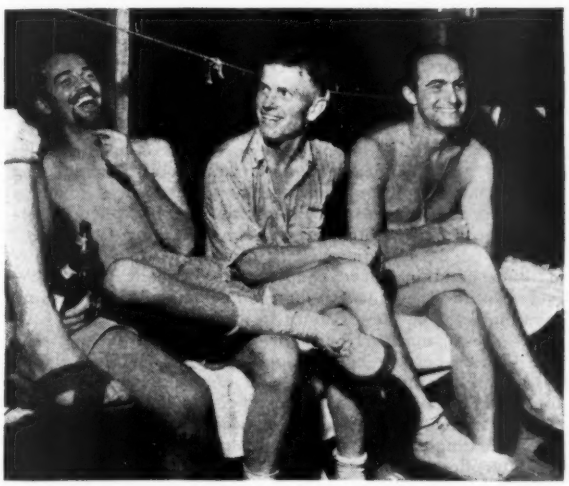
figure, being dressed in a long black coat and silk hat, executed a very creditable jacknife, with a half twist, off one end of the pier—unfortunately he landed in a rowboat.

This anecdote illustrates the spirit of our present advances in the Pacific. The Jap fighter pilot no longer has things his own way. At the complex business of operating a fighter command, the Navy and Marine Corps have led the way all through the Pacific. The Jap has shown a certain imitative ingenuity, but he has been hard-pressed to keep up with our changes and new developments. The attempt of the Japanese fighter pilots to adopt our four-plane tactical section is a case in point. Apparently the whole operation is too complicated for them. The times when they have tried to use it they have become hopelessly snarled—the four planes milling around like a quartet of unfriendly cats.

American fighter tactics have set a fast pace for the Japs even though Navy and Marine Corps fighter strength has been divided between land bases and carriers. The protection that carrier-based fighters have given dive bombers, torpedo planes, and their own carriers has made the Japs even more reluctant to engage in large scale attacks on the carriers. Some authorities believe that this situation will be reversed as American forces near Japan proper. But the carrier-based fighters are piling up additional Jap discouragement through their successful sweeps.

On these strikes the fighters concentrate on reducing enemy fighter strength in the target area. Then, when the bombers arrive, they have a much greater chance to drop their loads in safety. Another devastating fighter blow at Jap defenses is the anti-sub combat air patrol. These patrols are carried out by single torpedo planes escorted by single fighters. The fighter-torpedo anti-sub team has proved itself highly effective. In enemy waters several such patrols, of four-hour duration, are kept under way throughout daylight hours. The duty of the fighter pilot is to protect the torpedo plane from air assault and to aid in attacks on the subs.

In addition to all this, carrier fighters have spread other miscellaneous destruction as the war moves across the Pacific. Once a carrier task force has eliminated the enemy air opposition and bombed the land installations, the fighters frequently



Men of the famed Skull-and-Crossbones squadron. Left to right, Lieut. "Duke" Henning, ACI officer; Lieut. Comdr. J. T. Blackburn, the skipper; and Navy fighter ace, Lieut. "Ike" Kepford.

go in and have a general strafing spree, knocking down houses, chasing troops, and putting various guns out of commission. On one island in the Central Pacific, fighters performed the amazing feat of knocking out five-inch guns. Examination by invasion parties revealed that many of the Jap five-inch batteries were thoroughly shot up by the .50-caliber machine guns. Fighters are also called upon to protect the scout observation planes that are catapulted from cruisers and battleships to pick up knocked-down flyers from the sea.

Land-based shows up through the Solomons have been particularly spectacular. On several occasions recently, fighters have been used as masthead and glide bombers. It is even

Still the favorite fighter on escort carriers (CVE's), the Wildcat remains in production by General Motors.

possible that multi-purpose fighters may eventually eliminate the dive bomber and torpedo plane. Engagements of land-based fighters have at least shown that after they have released their bombs they can go ahead and perform the natural functions of a fighter plane.

Fighter commands on land bases are charged with defending the base (by use of fighter planes and antiaircraft guns), escorting bombers on strikes, conducting sweeps over enemy territory, and with such miscellaneous jobs as search, patrol, and reconnaissance. Recently, however, there has been an interesting and significant move in the South Pacific area toward organizing the several military air services under a central Naval command. Working as one big team under Adm. Aubrey Wray Fitch, Army, Navy, Marine Corps, and New Zealand fighters (as well as dive and torpedo bombers and other aviation) have conducted a brilliant campaign—largely obscured by the Southwest Pacific system of issuing communiques from New Guinea headquarters.

While the Grumman *Hellcat* has proved itself the best all-round carrier fighter—having supplanted the *Wildcat* which played such a commendable part in the early Pacific fighting—the Vought *Corsair* is the most popular land-based Navy fighter. The two planes are about equally maneuverable and have approximately the same climbing rate. But the *Corsair*, say many pilots, is more difficult to land on a carrier. It is preferred for land-based work, however, because it is somewhat easier on the controls.

Early models of the *Corsair* had a pronounced twitch to the right but this has been corrected by a simple "spoiler board."

On every big raid the fighter planes are stacked up in layers so skillfully arranged as to discourage the strongest enemy force. For the strikes on Rabaul the arrangement was generally as follows: "Close cover," about a thousand feet beneath the dive and torpedo bombers (and occasionally heavy bombers), was provided by New Zealanders in *Warhawks*, which function best at low altitudes. "Low cover," perhaps a thousand feet above the bombers, usually consisted of Navy or Marine *Hellcat* squadrons. "Medium cover," a thousand feet or so higher, was also made up of *Hellcats* and *Corsairs;* and "high cover," which ranged up to several thousand feet above the bombers, was nearly always Army *Lightnings*, whose peak effectiveness is reached at extreme altitudes, and *Corsairs*. A variant of this team was, and still is, a "roving high cover," developed in the later stages, which operates as a pack of hunters looking for enemy planes. The fighters use a four-plane division composed of two two-plane sections. These sections fly a constant criss-cross pattern known as a "scissors," which affords maximum vision and protection. Altogether, the fighter cover for our raids on Rabaul was so formidable that during February the Japs practically quit sending up air opposition.

Before all raids, of course, there is a thorough briefing session conducted by an Air Combat Intelligence officer. The pilots are a little keyed up but are quiet and intent on absorbing every bit of knowledge that will help them. An ACI officer at Bougainville, presiding at a blackboard covered with maps and photographs, briefs the fighter group for a strike on Rabaul in the following manner:

"Now men, the target tomorrow is the shipping in Simpson Harbor, secondary target, Lakunai Airfield. We'll go in on a course of 340 just north of the airfield (loud groans from the pilots). Yes, I know. There are seven antiaircraft guns there, but by God we didn't knock them out last time and the dive bombers have got to get them tomorrow. Who's the leader of VF-17? Oh, yes, Blackburn. Blackburn, you know where those guns are. We'll need a lot of protection around that area. That's where they came up to meet us trip before last. Who's the OTC (officer in tactical command) for tomorrow? Foster, of the Marine Squadron. Okay, here's the set-up. We'll have 12 P-40's [*Warhawks*] for close cover, eight F6F's [*Hellcats*] for low cover, eight F6F's for medium cover, and eight F4U's [*Corsairs*] for high cover. All right, hold your horses. There'll be a roving high cover to protect the high cover—I don't know yet just what—P-38's [*Lightnings*] or F4U's—We'll let you know in plenty of time. Now the TBF's [*Avengers*] will rendezvous at 1,000 feet over Green Island at 1410 and the SBD's [*Dauntlesses*] at 1335 over Torokina air strip (on Bougainville). Take-off will be 1330 for fighters—let the roving high cover planes take off first, and the cover planes afterwards. Now, men, if you're forced down don't hesitate to get on that radio and call Dumbo (the *Catalina* rescue planes). Give your position clearly and get out your raft and keep your eyes open. *Don't* paddle ashore anywhere near Rabaul. Paddle out and wait for Dumbo.

"When you get to the harbor, the dive bombers will go in first, as usual, and the torpedo planes afterward. After

Navy Corsairs on Piva fighter strip at Bougainville. Corsairs may soon go back into carrier-based squadrons.

the shipping has been struck, rendezvous at Point 36 on the little maps that were passed out to you, and for God's sake join up promptly. In the harbor, as I believe all of you know, here are about 12 cargo ships, along the line there on the map from point 14 to point 22, and also a couple of cruisers, here at point X. They sneaked in Tuesday night. Strafe hell out of those cruisers if you can, close cover. Now the main thing, as you've been told 200 times, is *don't straggle*. No matter what comes up, fight as a team.

"About that strike yesterday, there were a couple of points. One thing is, the Japs apparently have a captured F4U. They've painted it black, so watch out for it. Get it if you can. Another thing—yesterday only close cover went down with the bombers. Tomorrow both close cover and low cover will go down—one division of fighters with five or six planes. Divide up and don't get confused. The SBD's will come in at 7,000 feet. All you fighters who are going down try to scissor at around 400 m.p.h. Medium and high cover start a gradual let down until you get to the rallying point.

"All right, anybody got anything to say about yesterday?"

A Marine stands up and says, rather shyly: "I'd like to thank two F6F boys who got a Jap off my tail. I don't know who they were."

Another Marine, peevishly: "I'd like to suggest that we don't have the same frequency on this strike that Green Island has. There's too damned much chatter on the air. I don't see why we have to have Green Island bitching it up and *Dumbos* and all the rest."

ACI officer: "Major Volcansek of operations said he was going to find out about that, so I imagine it will be taken care of. Anybody else?"

A Navy pilot: "Yeah, yesterday when the TBF's went down I saw a lot of white smoky puffs on the water. What were those?"

ACI officer: "I don't know. We thought at first they were the new rockets the TBF's carried but we believe now the Japs were trying some sort of diversionary trick. We'll have more information for you later. Nothing else? Okay, let's go get 'em."

That session indicates, in general, how fighter briefings are done. That raid went off very well. Five of the anti-aircraft guns were knocked out, the cargo ships were largely put out of commission and the cruisers were both bombed and strafed. Practically no Jap fighters were met. Once, however, things were much tougher. Marine Lieut. (now Capt.) Kenneth Walsh, one of the outstanding aces of the war once reported: "That morning our mission was to escort 26 *Liberators* from Guadalcanal to bomb the Jap airdrome of Kahili on Bougainville Island. The fighters and bombers took off from Henderson Field and at 1100 we rendezvoused over the Russels which lay along the route to the target.

"As we started up The Slot, we had eight P-40's flying close cover, below and abreast of the bombers, while the 22 *Corsairs* flew intermediate and top cover. Then, only a few miles northwest of the Russells, the fighter escort commander developed engine trouble. He ordered me to take over, and returned to base.

"This was the first time I had ever had such an important command and it was hard to believe that, as the leader of a 30-plane fighter escort, it was my responsibility to get all those bombers up to the target and then safely back home.

"All the way to the target we had excellent cloud cover. Over Kahili airdrome the bombers ploughed straight through heavy flak and really knocked hell out of the place. When the last bomb was away, the Jap fighters still hadn't climbed up to intercept, and we started to retire as we had originally planned.

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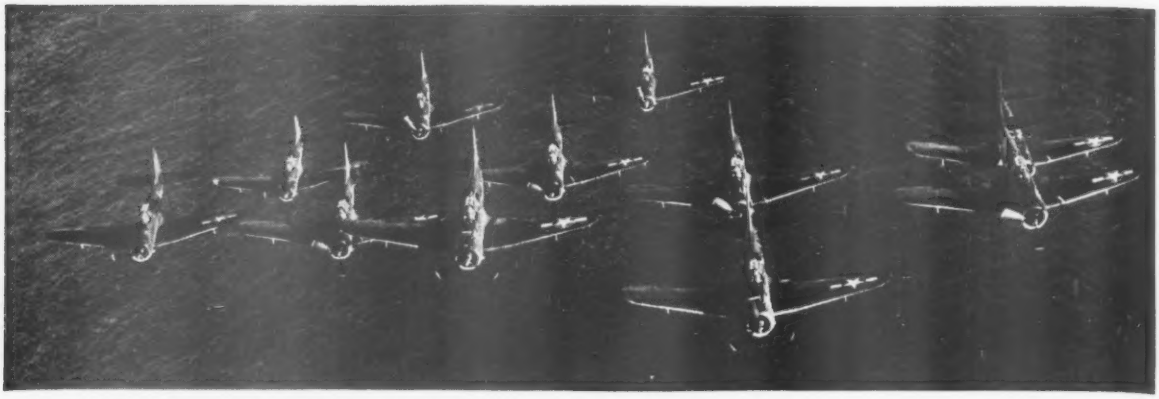
This is the latest Wildcat in production. It is General Motors FM-2, has greatly increased performance, modified tail surfaces.

THE DIVE BOMBERS



Formation of Dauntlesses with Task Force 58. Superseded by newer type, production of this war-tested veteran was halted in July.

Split-second performance and pin-point accuracy in bombing strikes has made the dive bomber one of the most lethal weapons in Naval warfare.

THE use of the scout bomber, or dive bomber, has been a major development of U.S. Naval aviation. Hitler publicized dive bombing with a fairly limited imitation of our techniques, employing the well-known *Stuka*. The Japs, with better than average imitative zeal, produced the Aichi *Val*, which they used successfully in the early Pacific fighting. These imitations have never achieved the offensive force which has characterized the Navy's dive-bombing attacks.

There are several schools of thought about how dive bombing should be done. "When we speak of dive bombing," a Navy pilot recently said in a press conference, "we mean straight down—like this (motioning with his hand)—right down the smoke stack. If your airplane doesn't stand on its nose and lay eggs right in their lap, then you are not dive bombing."

Neither the Japs nor the Germans are in complete agreement with this theory, preferring a modified dive. But the destruction wreaked upon Jap battleships, carriers, smaller ships and shore installations is ample evidence of the pin-point accuracy of the vertical bombing run. We use our scout bombers for various kinds of jobs. Both the Curtiss *Helldivers* (SB2C) and the Douglas *Dauntlesses* (SBD) are proficient in glide bombing, minimum altitude or skip bombing, strafing, search and patrol, anti-submarine bombing, mine laying and photographic reconnaissance.

At each of these missions Navy pilots have performed heroic feats. The oustanding flyer of the Battle of Midway, according to Vice Adm. Raymond Spruance, was Lieut. Comdr. (now Capt.) C. W. McClusky, group commander of two dive bombing squadrons on the *Enterprise*. "His decision to go and find the Jap decided the fate of our carrier task force" said Admiral Spruance, "and our forces at Midway and perhaps at Pearl Harbor and the Hawaiian Islands." It was the 1,000-pound bombs, "laid in their laps" by dive bomber pilots, which peeled the flight decks from four Jap carriers and turned the invasion fleet westward at a time when we had yet to get our second wind.

Four years before the Allied invasion of Europe, when the German army was sweeping westward through Belgium and France, the terror of the skies was the *Stuka* dive bomber. Used almost wholly in co-operation with ground troops, this plane spread confusion among Allied troops and civilian refugees. With it Hitler won his greatest victories. Few people realized in those grim days that the tactics of dive bombing were developed at Pensacola, Fla., in the middle 20's—the infancy period of U.S. Naval aviation—and that they had their birth over the jungles of Haiti in 1919.

Twenty years before the *Stukas* bombed ahead of advancing German troops in Europe, Marine flyers in Haiti, using De-Havilland DH-4B-2's came up with an on-the-spot dive bombing technique. The equipment included a canvas mail sack from which a bomb was released by a rope-and-pulley system after the plane was pointed downward. In 1928 the Marines in Nicaragua used the first plane designed specifically for dive bombing, the original Curtiss *Helldiver*.

Just how tough a dive bomber plane can be was demonstrated by the experience of Sgt. E. E. Ballard, a Marine pilot flying an anti-submarine patrol off the Russells last year. He was attacked by seven Zeros, which dove on him out of the sun. His position was not improved when his rear seat man's gun jammed after 15 rounds. For 35 minutes Ballard's plane took it, while twisting, skidding and zooming. "The attack was run on me just like they thought I was a dead duck," Ballard

Helldivers ready for bombing strike take-off. The only Navy dive bombers now produced, they have 1,700-h.p. engines.

said. But his *Dauntless* got him and his gunner home with only minor wounds. The plane was so badly shot up by 20-mm. and 7.7's that it was junked.

The *Helldiver* is potentially, at least, a vast improvement over the rugged but more limited *Dauntless*. It has greater range, carrying power and armament. What happened to the Japanese fleet off Saipan in the summer of 1944 is an eloquent testimonial to the *Helldiver's* Sunday punch. In July, 1944, production of the *Dauntless* was closed out at El Segundo, Calif., making the *Helldiver* standard Navy carrier equipment.

Perhaps dive bombing's most spectacular use was in the Battle of Midway. It was here that the Navy's technique met its first real battle test and paid huge dividends. A Jap attack force comprising battleships, cruisers and six large troop transports heading for Midway was first sighted by a Naval scouting plane early June 3. The next day an Army *Flying Fortress* from Midway reported: "The main enemy force has been sighted. Six major ships in column." This information, to put it mildly, was somewhat vague. It confined the position of the enemy to an area of several thousand square miles of ocean in the Mid-Pacific. An immediate search by carrier-based planes was ordered.

Air Group Commander McClusky and 33 planes were launched from the *Enterprise*. What he did not know was that the Jap, spotting our own task force, had reversed his course to the northwest. Not finding the Jap at the estimated position, McClusky's group continued the search, despite the fact that they had almost reached their prudent limit of endurance. The enemy, including four big carriers, was discovered shortly after noon, and McClusky's squadrons attacked. Twenty minutes later, Lieut. Comdr. Max Leslie with a group of dive bombers from the *Yorktown* joined the battle. The two groups sank three carriers. Later, McClusky's flight and planes from the *Yorktown* returned to finish off the yet undamaged fourth carrier. The enemy's sting had been removed; he turned tail and retired. Midway and possibly Hawaii and the Pacific coast had been saved.

Laying it "in their laps" with a dive bomber is no job for a tyro. Consider the experience of Lieut. (jg) R. P. Regester while bombing the Jap fleet off Saipan. As he screamed down from 12,000 feet, his cowling flew back against his wind screen, blinding him. Regester continued his dive, however, until the loose cowling worked up enough for him to take aim. Then he released his bomb, and came out of his dive at 1,000 feet, "pulling 11½ G's." "Those wings had regular waves in them, but they didn't pull off," he declared. With the cowling still draped over his wind screen he flew back to the carrier but he was forced to ditch when his fuel ran out before he could be taken aboard. Picked up by a destroyer, he returned to the friendly jeers of shipmates who told him "you were scared to bring it in after accordion-pleating the wings."

Enemy antiaircraft fire has not yet stopped a dive bombing attack, and for this reason dive bombers become the backbone of attack. Fighters protect the dive bombers and torpedo planes. The dive bombers drive home their disabling attack and the torpedo planes come in for the kill. The success achieved by carrier groups in using these tactics is well known. Not to be forgotten are dive bomber attacks on the *Jean Bart* and other men-of-war at Casablanca, where they inflicted serious damage to a threatening and valorous Naval force, and suffered only superficial scars from heavy antiaircraft fire.

Dive bombers also serve as scout bombers. Shortly after Midway many units of the fleet steamed into the South Pacific. For a month preceding the assault on Guadalcanal, dive bombers did yeoman work in scouting. Each day search flights were launched and the dive bombers ranged far out ahead of the warships looking for anything with a Rising Sun stamped on it.

In its ability to spot the bomb load accurately on specific targets, the dive bomber will continue to be one of the most effective weapons. When the target is on land, the high and medium altitude horizontal bombers with their fine bombsights and tremendous bomb loads are highly effective. Against ships at sea, the dive bomber has little competition from the medium and high altitude horizontal bombers. The dive bomber's nose holds its aiming point regardless of a vessel's maneuvering. The more recently developed mast-head or low-level bombing produces extreme bombing accuracy, where the

antiaircraft defenses are scattered. Against well-defended ship targets where antiaircraft batteries are concentrated this type of attack is most hazardous.

The use of dive bombers by naval forces has largely been confined to the American and Japanese navies. The Japanese version of the dive bomber is an imitation of American types. At Pearl Harbor where a number of Jap planes were shot down it was found that their dive bombers were of recent design but that they lost performance through a fixed landing gear. It is probable that a type now is produced in Japan with retractable landing gear. The Japs have used dive bombers in every action in which their carriers have participated. They also have used land-based dive bombing attacks in the Solomons.

The dive bomber plane is a development of the scout bomber. Many manufacturers have taken part in its evolution. Vought built several observation and scout bomber models. Curtiss made three, including the SBC, the first to be used specifically for dive bombing. Martin, Great Lakes and Douglas have produced one each. The requirement that the plane be able to withstand the enormous strain during the pull-out from the dive added many complicated design problems.

Another lesson learned is that accuracy approaches 100 per cent as the range approaches zero. This percentage of accuracy cannot be achieved, since the pilot must release his bomb at an altitude which will enable him to pull out. The attack is made from the sector in which antiaircraft fire is least effective —the 20° vertical cone with apex at the antiaircraft gun. Moreover, the diving brakes must be designed to open and close in split seconds. Another requisite is maneuverability. Jap destroyers can turn on a dime. The dive bomber not only has to be slow in the dive so the pilot can carry the attack right down to the target, but it also must be highly maneuverable so he can easily and quickly correct his point-of-aim.

Then comes the problem of get-away speed after the attack. High speed is a good thing to have in a dive bomber under almost any circumstances except when in the dive, but there is one period when high speed is vital. From the moment the pilot closes his dive brakes after delivering his bomb until he is out of reach of the opposition, he must have speed which compares favorably with a fighter's sea-level speed.

There are other requirements which the dive bomber shares with different types of planes. The dive bomber must carry all the armament it needs, but not a pound more. Its primary armament is the bomb and the fuel necessary to carry it to the target. Every pound of gun and ammunition eats into the pay load. Dive bomber pilots consider two guns as the minimum number and regard the .50-caliber machine gun as packing an adequate punch, although the practice of late has been to install 20-mm. as well. An equally important factor is radius of action. The dive bomber's range must be the greatest that can be squeezed out of a compromise with other characteristics.

Comdr. E. P. Smith, attached to the staff of the Naval aircraft chief in the South Pacific, summed up dive bomber planes in a battlefront message to Washington's naval designers:

"Please make our dive bombers to do the required job, but keep them as simple as possible, and rugged enough to keep flying when the going is rough. Our carrier groups operate from carriers one day and from the roughest kind of advance base airfields the next day. Maintenance of modern aircraft is sufficiently complex under simpler circumstances."

Commander Smith doubtless had in mind that one carrier dive-bombing squadron was based at Henderson Field, Guadalcanal, for five weeks and participated in attacks on 94 Jap ships. Pilots and planes were constantly on the alert. Jap naval vessels shelled Henderson Field, and enemy air raids were a regular occurrence. Debilitating tropical illness, dysentery, and other ailments beset the squadron, but the dive bombers kept pitching, helping the Marine Corps pilots and other Naval flyers maintain the newly won positions. Operations from Guadalcanal consisted of strikes against Jap antiaircraft at Munda on New Georgia, attacks on shipping at Kahili on Bougainville and other difficult actions. END

Helldivers in flight. This new plane is designed to carry a heavier bomb load faster and further than any other dive bomber.

Designed for patrol duty, lightly-armed planes like this Kingfisher have set an amazing record of extra-patrol achievements.

SCOUT-OBSERVATION

Amphibious warfare has catapulted scout-observation planes into new and dangerous roles far beyond expectations of their creators.

WHEN the full record of wartime innovations is written, it will be recorded that amphibious warfare catapulted the slow, lightly armed scout-observation planes from the decks of battleships and cruisers into new and dangerous roles far beyond the design expectations of their creators.

The SO's scroll of achievement will list these feats: knocked out enemy gun positions and broke up tank attacks, sank enemy U-boats, although equipped with pontoon landing gear; operated on reconnaissance missions 60 miles inland over hostile territory; undertook close air support of troops engaged in landing operations, skimmed at tree-top height to strafe enemy troops and installations, landed in heavy seas to perform difficult rescue missions, and even accomplished the surrender of enemy infantrymen, herding them into the hands of our own ground forces.

This last feat is, perhaps, the most spectacular single exploit of any pilot, so far, in the war. The central figure was Lieut. Paul E. ("Pete") Coughlin who, with his radioman-gunner, Richard Shafer, of Albany, Ore., was catapulted off his ship to a ringside seat in the Sicilian campaign. Flying down the beach near the little town of Scoglitti, Coughlin spotted a group of men working on a gun position. It was apparent that the men were not U. S. troops. Coughlin promptly radioed his cruiser for permission to bomb the position. Back came the answer:

"Bomb all except our own troops on the beach."

That was an order calculated to delight any SO pilot. Armed with two bombs and two .30-caliber machine guns, Coughlin and Shafer set out to carry on the war according to their ideas.

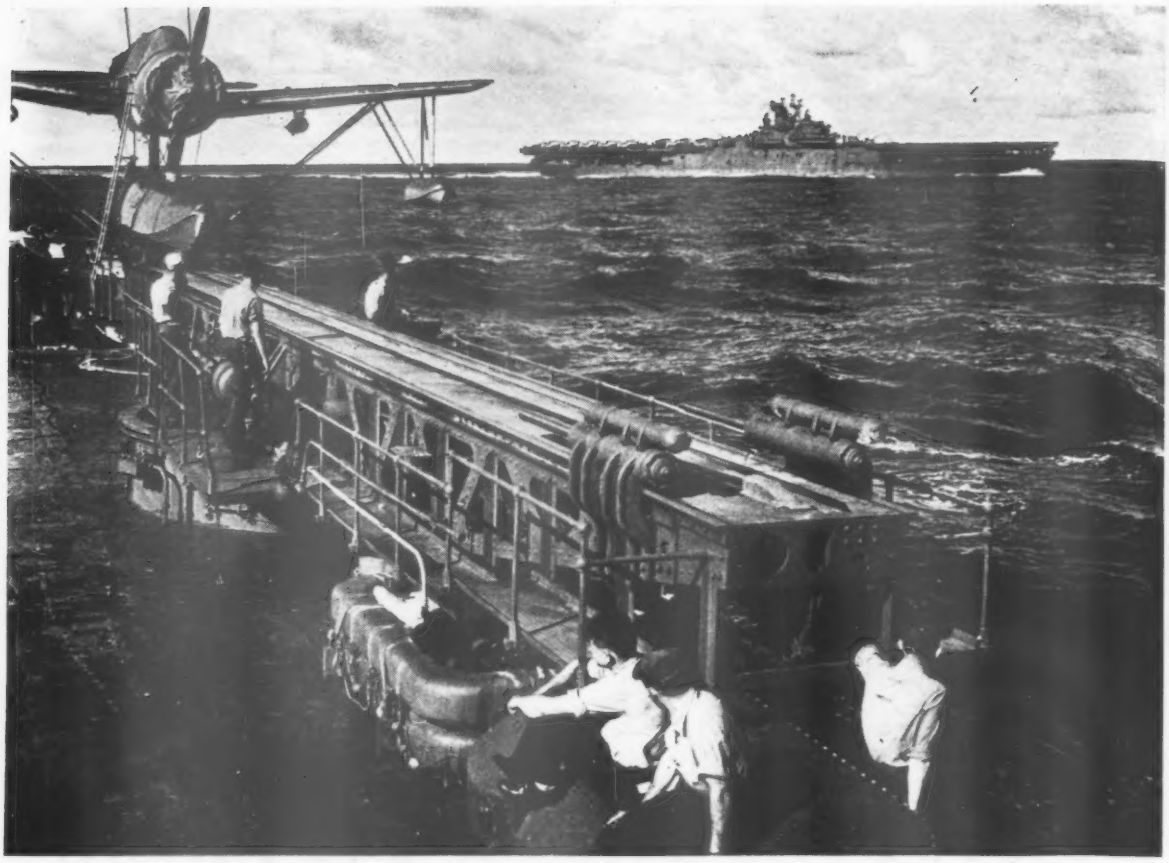
They started an attack on the enemy gun position from 2,500 feet, letting go the first bomb. It landed squarely on the gun position but didn't explode. In his haste, Coughlin had used the wrong safety. The enemy quickly scattered.

Pulling out of the dive at 300 feet, Coughlin and Shafer hunted up the American patrol attacking Scoglitti. The Yanks suddenly appeared down behind a cliff, pointing and waving upward. They were trapped by an enemy gun position at the top. Promptly the SO plane circled the hill, spotted about 60 enemy soldiers running toward a small stream that led back into the valley. The second bomb was dropped but did little more than scare the opposition. The enemy took refuge in a hedge and started firing at the plane with rifles.

Coughlin climbed higher and flew parallel to the hedge, giving Shafer a good broadside shot with the .30-caliber machine gun. On the fourth run the enemy forces came out waving white flags, handkerchiefs, coats, trousers and everything they could lay their hands on.

Here is the rest of the story in Lieutenant Coughlin's own words:

"I flew down just over them, waving for them to go in the direction of our troops. They did not get the idea. Shafer cut loose at the center of the group with his gun. Most of them learned quickly what we wanted them to do. The few that didn't got a thorough example of Shafer's accurate fire. I circled above them and turned the job of directing their movements over to Shafer. His gunfire at their heels kept them on the run.



Battleship and cruiser catapult planes in task force spot gunfire, get fighter cover from accompanying carriers.

"Looking about the top of the hill for a way to direct them where they would be in the open, I saw white flags waving from four entrenchments. As the prisoners from the hedge drew up to one of these positions, I would fly over and wave for them to come out and join the others. If they were slow in leaving the positions, a few shots were fired close to them In this way we got all of them out into the open and headed for the beach.

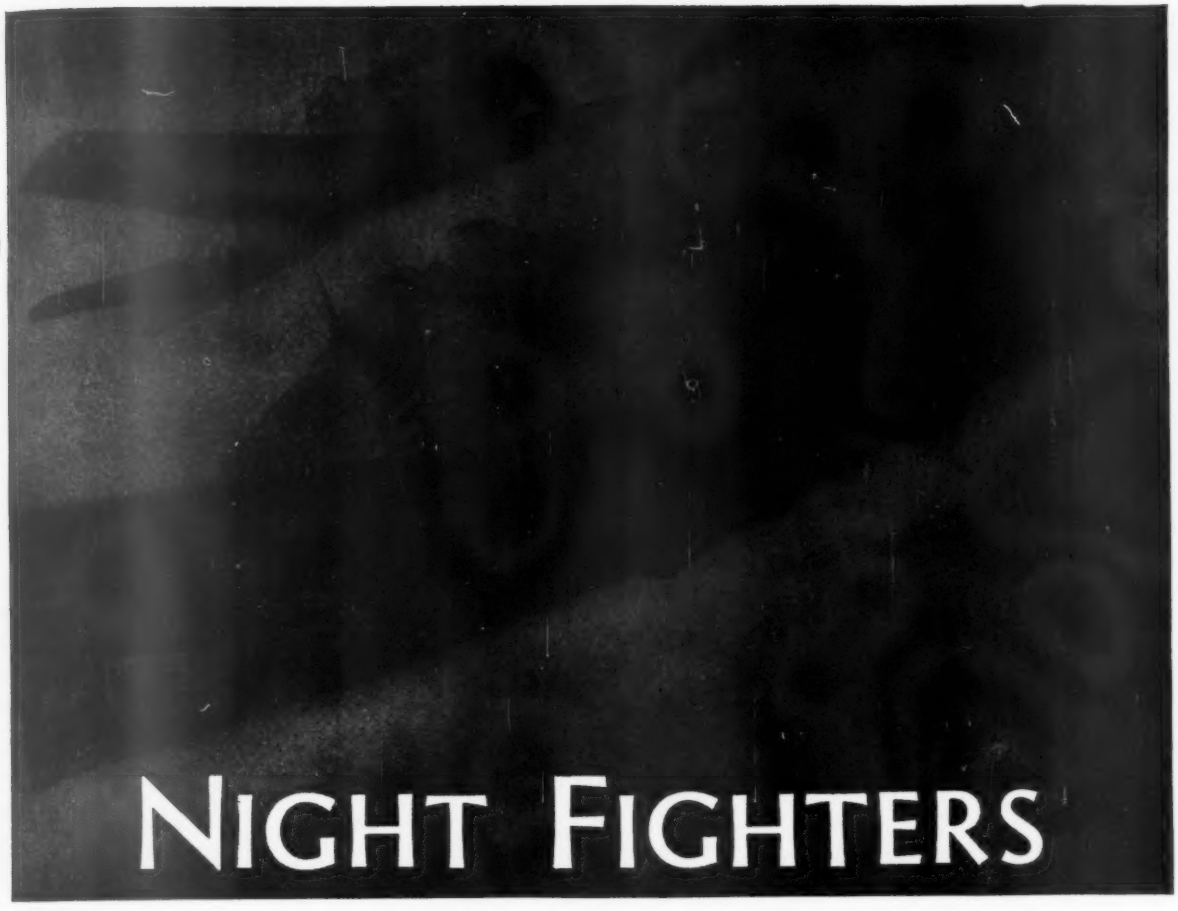
"We rode herd on them very much the same as in handling cattle. When one started to stray, a few close shots brought him back into line. At a critical point when they were scattered out, the free gun jammed. I circled low and Shafer kept the gun pointed threateningly in their direction. One made a dash for the barracks. Had he escaped, the rest would have followed like sheep. I was too close to get my fixed gun on him so I dived and tried to hit him with a wing. As we passed over the prisoner, I heard shots coming from the rear cockpit I turned to see Shafer aiming the machinegun and firing his .45 beside it His aim was good for the fugitive ran back into the center of the group.

"The prisoners came to a road which ran down to where our patrol was stationed on the beach. Shafer had his gun working now, and by strafing the far side of the road and not allowing them to cross, and then by strafing both sides, we soon had a column of 120 prisoners marching down the road three abreast. When they were in the hands of the patrol that just a few minutes before had been under their fire, we returned to the hedge and again strafed it and other positions, this time, coralling about 30 stragglers."

Lieutenant Coughlin, a native of Edina, Mo., had considered himself "shelved" when he was assigned to the U.S.S. *Philadelphia* in New York, early in the war. He had dreamed of taking a fighter off the flight deck of one of Uncle Sam's big carriers. Instead, he found himself assigned to a cruiser; fine, powerful fighting vessel, but one whose old SO planes looked as if

(*Continued on page* 286)

Making a lee, cruiser provides safe landing for its Kingfisher.



NIGHT FIGHTERS

Skilled in instrument navigation, these Hellcat pilots hang their planes on a star to put fighter protection on a 24-hour schedule.

Already past the experimental stage, night fighting tactics promise increased security as we near the enemy's home ports.

NIGHT fighting is the infant prodigy of Naval aviation. It has produced the answers to questions of Naval warfare that threatened to stump the experts. Comparatively new to U. S. war theaters, the Navy's aerial night fighters nonetheless have played a unique part in the fighting picture during their short lifetime. Their bag of tricks promises to provide one of the fascinating stories of the war when it can be fully told.

Night fighting has a pronounced Buck Rogers quality. It applies a scientific knowledge to the business of killing which, in its practical operation, ranks with the best sleight-of-hand. While night aerial operations are not new to the Navy, night fighting only recently made its debut. Even now it is hardly past the shakedown stage.

In view of the strides it has already made and of its great potentialities, its development as an effective weapon seems assured. Not even the scientist in his laboratory can be certain just where it will end. It is a question, however, that the harried enemy has pondered with real concern.

The details of night fighting are still a Navy secret but enough has been officially disclosed to permit, for the first time, a rather general account of its operation and history.

As equipment improves and experience is gained, the methods of this operation undoubtedly will change. New types of planes will be tried, and new tactics developed. One thing seems probable—the security of the Fleet will become increasingly dependent upon night fighter aircraft as we get nearer the enemy's home bases and as daylight attacks become costlier. For that reason, a look at Navy night fighting might be of particular interest now.

The time was February, 1944, when the Pacific Fleet staged its initial raid on the so-called fortress of Truk. . . .

As the blacked-out carrier task force steamed away from bombed Truk during the night, darkness covered it with only partial security. All hands waited grimly, knowing that a night raid was inevitable—a tactic for which the Jap air force was showing increasing preference. The attack was not long in materializing. The call to general quarters sent all hands scurrying to battle stations. An enemy, striking out of the darkness, had to be repelled.

On the black flight deck of an *Essex* class carrier, crewmen quickly readied a *Hellcat* fighter for Lieut. R. L. Reiserer, executive officer of a carrier night fighting squadron. Reiserer jumped into the darkened cockpit and the plane roared out into the blackness to intercept.

On that night it must be reported that Lieutenant Reiserer did not stop the Japs. But Reiserer did make a night contact with the enemy and thereby rang up another "first" in U. S. Naval aviation's long list of pioneer accomplishments. He had demonstrated the value of the specially trained carrier night fighter pilots—the Navy's "Black Chickens."

More important to fleet commanders than the contact itself was the fact that Reiserer was launched and taken back aboard

(*Continued on page 222*)

Pride of the Navy, "Grumman Avengers have participated in more different types of missions than any other plane ever designed."

THE TORPEDO BOMBERS

Deadly planes and new battle tactics have made the torpedo bomber Public Enemy No. 1 of a faltering and hard-pressed Jap fleet.

AT THE evening movie aboard a big carrier in the Pacific, the first short subject was an animated cartoon. Upon the screen a flaming figure zoomed about while the talkie device screamed with excitement: "It's in the air! It's a man! It's a bird! It's an airplane! It's SUPERMAN!!!"

"Naah!" cracked a leatherlunged crewman from the audience, "it's a TBF!"

The remark was greeted with laughter and cheers, for that day the carrier's torpedo squadron, flying the famous Grumman *Avengers* (TBF's) had sowed mines in the harbor at Palau. This job was so well done that no ship in the harbor at the time of the mine planting ever got out. Thousands of mines had been laid by aircraft, but this was the first time carrier-based planes had, with fighter protection, gone right into the enemy's front yard and done the job. So well did they seal off the harbor that the enemy was unable to use it for a staging point or for any other purpose while the big Hollandia attack was in progress.

Laying mines in enemy waters is just one activity of the torpedo squadron. Naturally, dropping torpedoes is another. Among other tasks performed by these sturdy planes and their crews are high-level bombing, skip bombing, masthead bombing, dropping depth charges on submarines, and scouting. In emergencies they have acted as their own fighter protection.

Launching a torpedo from the air presented ordnance men and aviators with an extremely complex problem of war. The torpedo is one of the most destructive and at the same time one of the most delicate missiles used in combat. It is designed to deliver half a ton of powerful explosive against an enemy ship at its weakest point—deep below the waterline. To accomplish this the torpedo must be self-propelled and self-steered. The engines for doing these jobs must be contained within the small shell of the torpedo itself. Naturally such engines cramped into so small a space must be as delicately made as the finest watch machinery. The task of manufacturing such machinery was fairly simple; we have plenty of watch makers who understand this kind of work. But to make it function under the heavy strain of aerial launching at high speed and at some distance above the water does not exactly come under the head of watch making. The Bureau of Ordnance accomplished just that—within limitations.

To withstand the shock of launching and to function properly after it hits the water, the torpedo must be launched

These 2,000-pound bombs provide Avengers and Helldivers with a knockout punch. Note messages chalked to Tojo by deck crews.

correctly. It must enter the water at a prescribed angle with the surface. To obtain entry at the correct angle brings up a problem of physics in which both launching speed and launching altitude are factors. This requires absolute precision flying. Precision flying requires thoroughly trained pilots and a completely trustworthy airplane. Furthermore, it should be remembered that torpedo attacks must be delivered at a comparatively short range and amid heavy enemy AA fire.

The answer to the thoroughly trained pilot, naturally, has been solved by thoroughly training pilots. To date, the favored airplane for the job is the *Avenger*—the famous Grumman TBF and its twin brother, the General Motor's TBM. Torpedo pilots swear by these planes.

Probably no other type of plane has undergone such rapid development and improvement since Pearl Harbor. Consequently, no type of squadron has had to readjust itself so much to meet present war conditions. This development and readjustment has moved the torpedo plane from one of a few types of missions to the old reliable of carrier warfare. The forerunner of the modern torpedo plane came into the Navy air arm in 1937. It was slow and had a limited range. Torpedo squadrons of that period spent the greater part of their flying hours training for horizontal bombing. The horizontal bombing attack was viewed with great favor. This was true even to the extent that dive bombers would fly formation on the torpedo planes and release their loads on signal from the bombardier in the torpedo plane.

The torpedo attack was designated as the low altitude attack. This meant that the torpedo planes made their approach low over the water trying to remain below the horizon to obtain concealment from enemy ships. Sometimes a smoke screen was used. Early in the development, the planes made their approach in close formation, wing planes dropping their torpedoes on signal from the leader. Next came the procedure of all planes fanning out and making individual approaches. It was a common practice to keep the torpedo planes tied down on the hangar deck of a carrier loaded with their bombs and torpedoes and there they would remain until the enemy was sighted and it was considered expedient to use them in delivering the knock-out punch.

Because of the slow and limited-ranged plane, torpedo squadrons were forced to continue the tactics used prior to the war and it was believed that these tactics were sound. It was realized that the torpedo plane was very vulnerable and needed much fighter protection. At Coral Sea and during other early thrusts by our carrier forces, the torpedo planes gave an excellent account of themselves. However, fighter escort was good and enemy fighters were not too numerous. Then came the Battle of Midway. It was a glorious victory for our carrier forces, but a disastrous day for the torpedo squadrons. Much has been written about the gallant efforts of Torpedo Eight, but little is known about the fate of the other torpedo squadrons which took part in that engagement. Other squadrons suffered as badly and their efforts were no less gallant. It was a terrible price to pay, but the lessons learned were to save the lives of many other pilots and pave the way for the development of successful new tactics.

At Midway it was learned that the low altitude attack had to be changed because the captains of enemy ships would turn their ships' sterns toward the attacking planes and the pilots were forced to make long "hauls" to get into position to attack. This, of course, meant that the time in the danger zone of enemy fighers and antiaircraft guns was so long that a breakthrough to launch torpedoes was virtually impossible. If a pilot did make an attack, his road out to safety was equally as rough as his road in. It also was learned that fighter protection was insufficient and in some cases improperly executed. It became evident that escort fighters must stay with the torpedo planes throughout their attack.

After Midway, the curtain rose on a new era for the torpedo planes and squadrons. Grumman and Douglas remained tops in the eyes of carrier pilots as carrier plane designers. At this point, Grumman gave to the Navy the now-famous *Avenger*. The capabilities of this plane, plus the experience gained in combat, were to revolutionize torpedo plane tactics. The *Avengers* were not to rest on the hangar deck and wait for the one big moment. They had new wings and were to venture forth and participate in more types of missions than any plane ever designed. The *Avenger* would carry bomb loads up to the weight of the torpedo and in many combinations, such as one 2,000-pound bomb, two 1,000-pound bombs, or mines, depth charges, and incendiary clusters. This meant that torpedo squadrons had to become proficient in virtually every type of carrier aircraft warfare. They now were not

Avenger pilot surveys destruction he has helped wreak on Jap installations at Marcus Island, shown burning in background.

This rare shot of a torpedo tracing its deadly course in Truk harbor was taken from Avenger that chalked up direct hit.

only concerned with torpedo tactics but glide bombing, anti-submarine bombing, low level or mast-head bombing, mine laying, strafing, searching, and all types of night missions.

Then torpedo squadrons really started their rampage against the country's enemies. In the Atlantic, *Avengers* operating from "baby flattops" very effectively helped corral the submarines. In the Pacific, Jap forces began to feel the swift, stinging blows of carrier-based torpedo planes. The Japs were worried and puzzled. At their carrier thrust at the Battle of Santa Cruz, torpedo squadrons, with torpedo and glide bombing attacks, took a good toll.

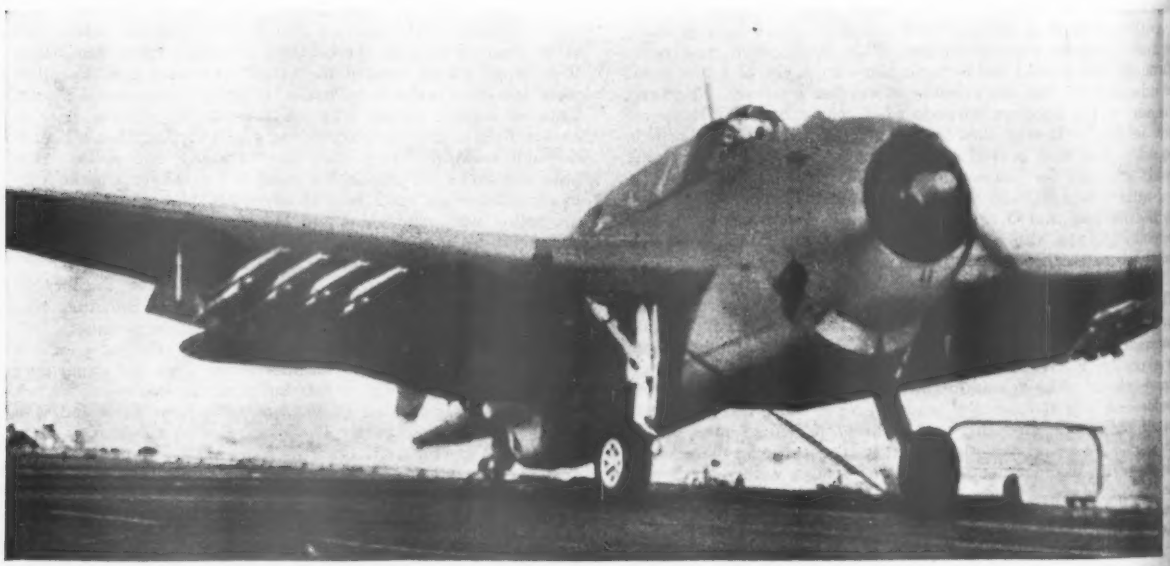
Due to the success of the *Avenger*, the Marines commissioned torpedo squadrons and moved them into the South Pacific. On Guadalcanal, Navy and Marine squadrons began working together.

A few weeks later, in the middle of November, the Tokyo Express made its last desperate attempt to retake Guadalcanal. The torpedo squadrons had learned their tactics well. Fighter escorts were improving. In the battle of Savo, one torpedo squadron made 15 torpedo hits out of 26 drops and scored five bomb hits out of six. Damage to the enemy by this squadron resulted in a battleship stopped and later reported sunk.

If this battleship had not been stopped it would have shelled Henderson Field. That shelling might have knocked out the aircraft which played such an important part in destroying an entire Jap convoy of three divisions of amphibious troops on the following day. In the same battle, the same squadron went on to sink a Jap cruiser and two transports loaded with troops. This was accomplished without the loss of a man in spite of heavy antiaircraft fire and ever-present enemy fighters. Fighter escorts did an excellent job. New torpedo plane tactics had been successful.

These tactics are of a hit-and-run type. Torpedo planes no longer creep in low over the water. They move in with the dive bombers and at high altitudes under the same fighter coverage. When the enemy is sighted, they dive down to the torpedo release altitude at speeds greater than 300 m.p.h. Speeds

(*Continued on page* 322)

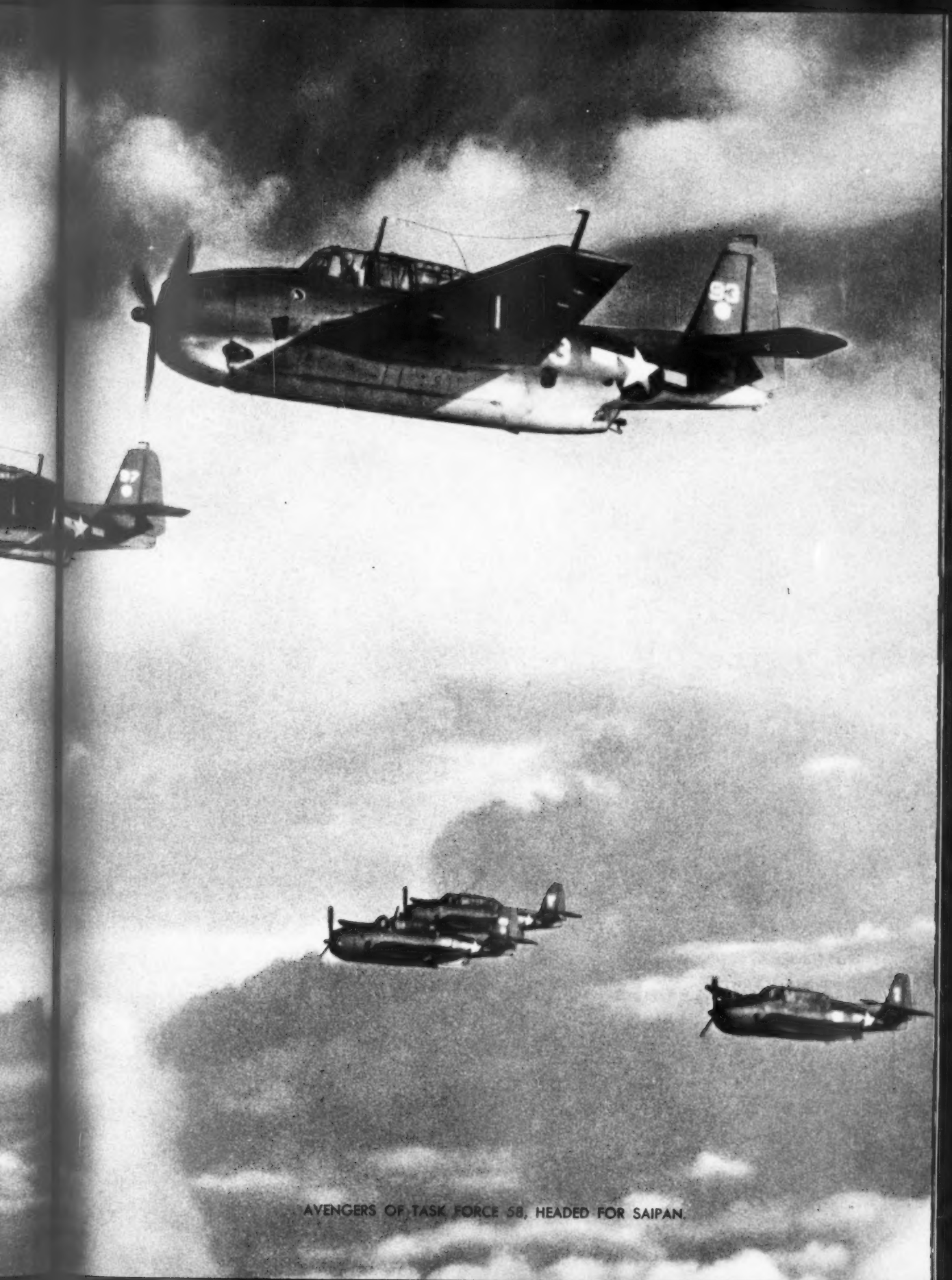


Mounting eight rocket installations—four under each wing—the Avenger tremendously increases its firepower for close work.

BACK FROM A RAID, TWO AVENGERS ENTER THEIR CARRIER'S LANDING CIRCLE.

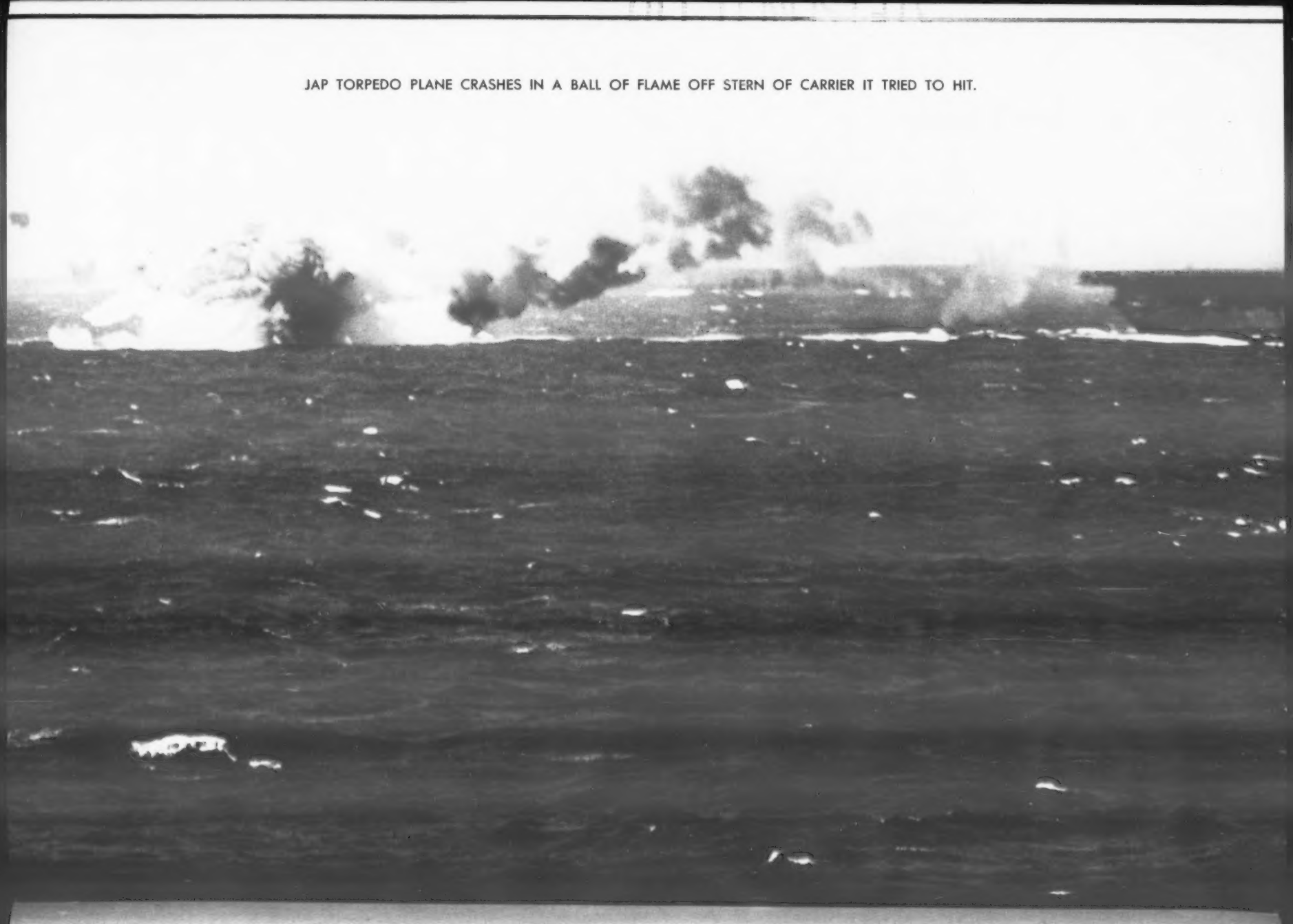
THE VETERAN GRUMMAN WILDCAT STILL IS THE STANDARD FIGHTER ON CVE'S.

VOUGHT CORSAIRS OF THE FAMED MARINE BLACKSHEEP SQUADRON OVER BOUGAINVILLE



AVENGERS OF TASK FORCE 58, HEADED FOR SAIPAN.

JAP TORPEDO PLANE CRASHES IN A BALL OF FLAME OFF STERN OF CARRIER IT TRIED TO HIT.



HELLCATS, AVENGERS AND DAUNTLESSES PREPARE TO TAKE OFF FOR STRIKE AGAINST A JAP BASE.

A CATALINA, NAVY 'DUMBO', PATROLS ALONG ALEUTIAN COAST.

THIS CORONADO IS SETTING OUT ON A PACIFIC PATROL. THESE BIG BOATS HAVE SHOT DOWN MANY JAP ATTACKERS.

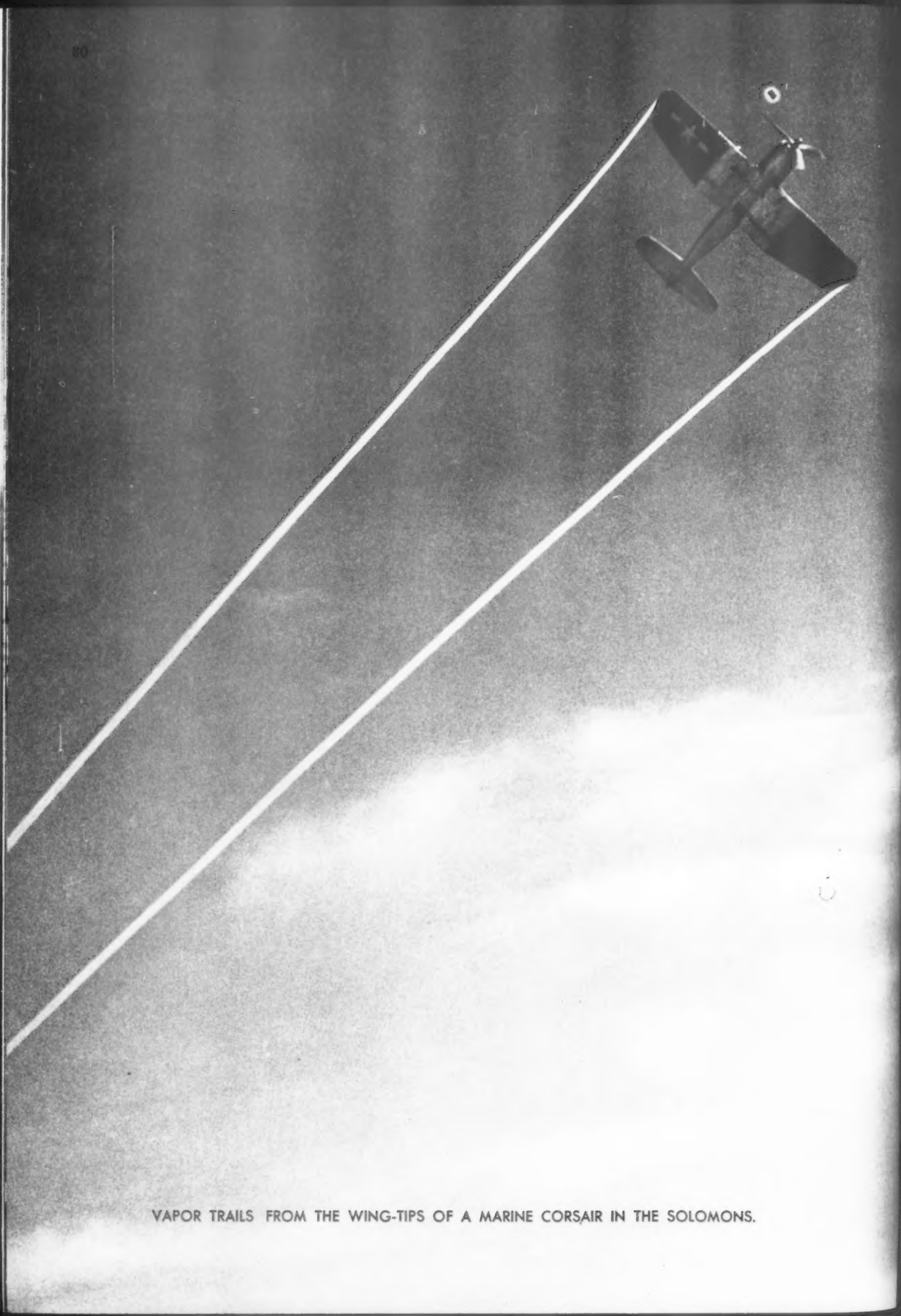
DECK CREW PUSHES A HELLCAT INTO POSITION TO BE WARMED-UP.

DECK CREW PUSHES A HELLCAT INTO POSITION TO BE WARMED-UP.

A HELLCAT IS HOISTED ABOARD A CARRIER HANGAR DECK IN PORT.

MARTIN MARINER IS ONE OF NAVY'S BEST SUB-HUNTERS.

CORONADO (PB2Y-3, DUBBED 'TWO-BY-THREE' BY AIRMEN) IS USED FOR PATROL AND CARGO FLYING.



VAPOR TRAILS FROM THE WING-TIPS OF A MARINE CORSAIR IN THE SOLOMONS.

A CATALINA COMES ALONGSIDE A SEAPLANE TENDER IN THE ALEUTIANS TO REFUEL.

DAUNTLESSES RETURNING TO THEIR CARRIER FROM A DIVE-BOMBING MISSION.

AN AVENGER PILOT WATCHES A 21-INCH TORPEDO LOADED ABOARD HIS PLANE

AN ALEUTIAN-BASED LOCKHEED VENTURA (PV-1) IS BOMBED-UP FOR A MISSION.

AN ESSEX-CLASS CARRIER ASTERN OF A LIGHT CRUISER. PLANE ON CATAPULT IS KINGFISHER.

SCRAPPLE FOR BREAKFAST IN Philadelphia . . .

THEN POMPANO FOR DINNER IN New Orleans

1 *A gourmet's dream?* Not by a delicious forkful! That'll be a *personal transportation* reality when you travel in your own Cessna. Yes, breakfast in Philadelphia, then for a gastronomic thrill...

2 ***Shrimp bisque, oysters poulette,*** pompano la Louisiane... any of the dishes that have made New Orleans world-famous. A delightful prospect...and simple to realize in a day...with a Cessna.

3 ***Get out a map. Spot your home town.*** Draw a circle with a 500-mile radius around it. That, roughly, covers the places your Cessna will take you between breakfast and lunch.

For pleasure or business, your Cessna will *triple* your travel opportunities, Mr. and Mrs. America.

And most progressive communities are already planning air parks (landing strips as in the picture) for your use.

Cessnas are now flying two million miles a day for our Armed Forces and the R. C. A. F. After the war, we'll need a period for reconverting our plant. But, as soon as possible, we'll be turning out your new Cessnas . . . *Cessna-engineered for Safety.*

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Be one of the first to own a Cessna after the war. Orders are certain to exceed production, but you can get a preferred listing for early postwar delivery. Costs you nothing. No obligation to buy. Write today for the Simple Priority Plan. Remember to buy War Bonds. Keep them to pay for your Cessna.

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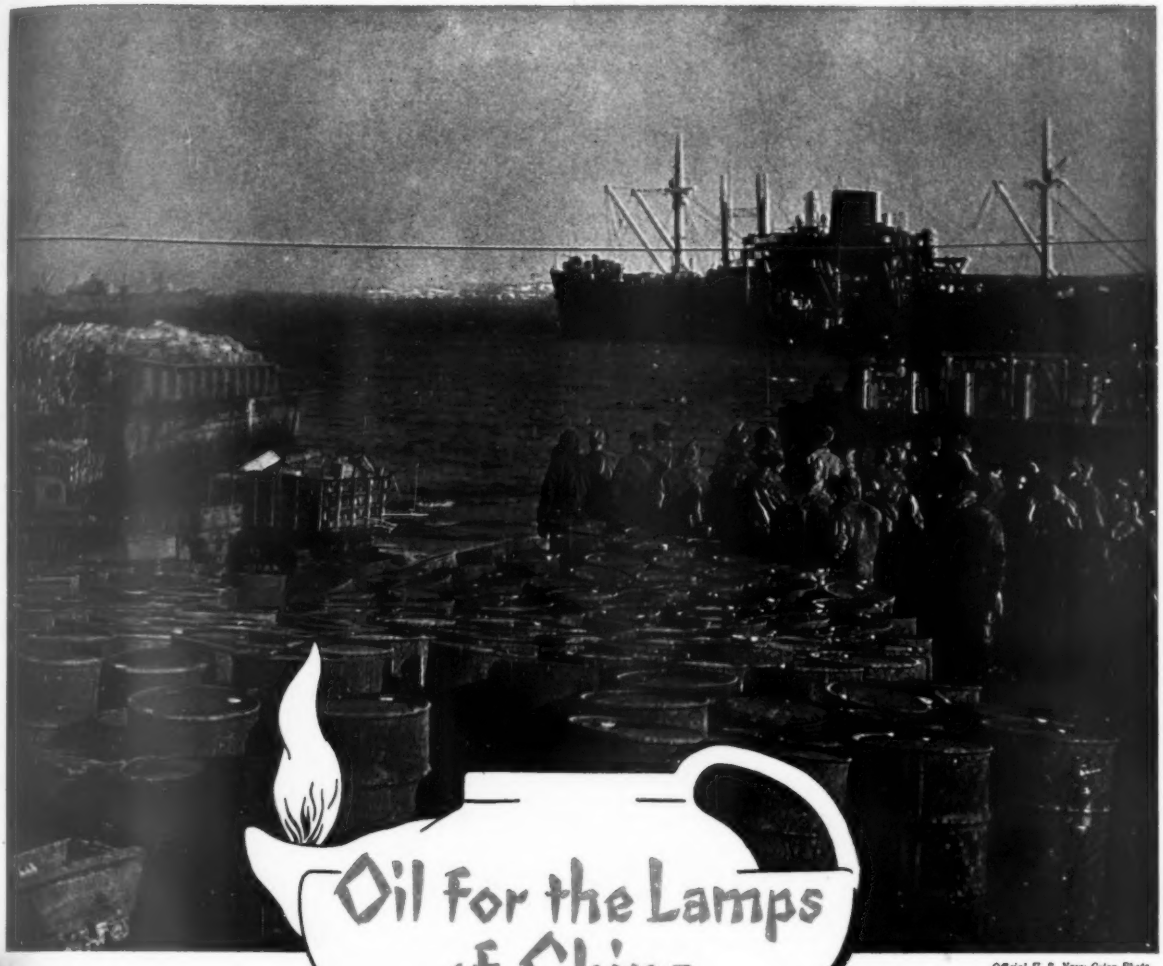
★ ★ ★ SYMBOL OF AIRCRAFTSMANSHIP FOR THIRTY-THREE YEARS

VITAL NAVAL CARGO, TO BE FLOWN OVERSEAS, IS LOADED ABOARD A DOUGLAS SKYMASTER (R5D).



Oil for the Lamps of China

Official U. S. Navy Color Photo

THERE are lamps in China that have shed no light for years. They are the lamps of Freedom, of Hope, and of Happiness.

Today those lamps are beginning to glow again. Faintly at first, but with a flame that burns ever stronger, they are piercing the darkness that enshrouds them. The fuel that gives them light is the oil that feeds the vast armadas of planes and ships that are moving relentlessly Westward — oil that America knows will some day make the Lamps of China burn as brightly as her own.

華燈常明

★ ★ ★

The manufacturers of Tri-Sure Closures feel gratified that their seals — which protect so much of America's oil supplies — are helping to safeguard "Oil for the Lamps of China".

AMERICAN FLANGE & MANUFACTURING CO. INC., 30 ROCKEFELLER PLAZA, NEW YORK 20, N. Y.
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Armament Division

HUGHES AIRCRAFT CO.

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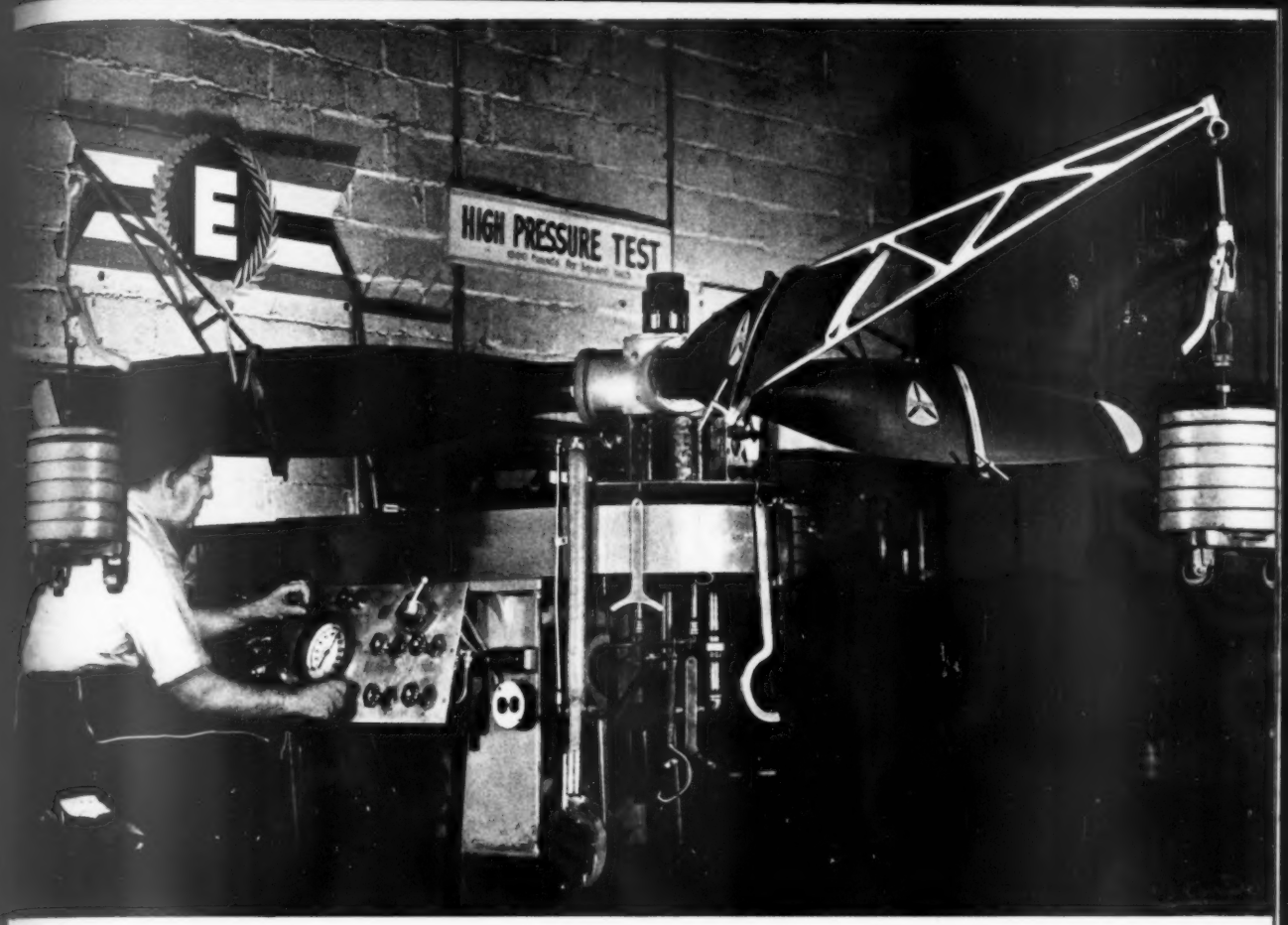
SIGNAL OFFICER OF A CVE DUCKS AS A WILDCAT SWOOPS TO LANDING.



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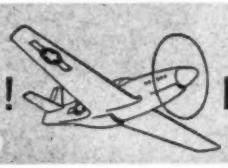
AT MORE than a thousand points along the production line the Aeroprop is inspected and tested. But before it "graduates" for fighting service the completed propeller is put through paces more strenuous than those imposed by actual combat flying.

The High Pressure test illustrated here is typical. On a special test machine an employee checks the pitch change mechanism of an Aeroprop. Working against twice normal pressures, the blades must turn surely, swiftly, precisely through every degree of pitch from low-pitch to full-feather. If they will do it on this machine—and they *must*—they will function efficiently under all conditions encountered in flight.

Making this kind of propeller, and making it this way, calls for skills of highest order. Making Aeroprops in the quantities now required demands large production facilities. Aeroproducts combines both. The character of the work produced by these men and these machines is best described by this fact: To date mechanical failure is virtually unknown on the thousands of Aeroprops that are flying in the service of the Allied Nations.

This record, important now, will also be important in the age of peace-time flight.

KEEP 'EM FLYING!  **BUY BONDS!**

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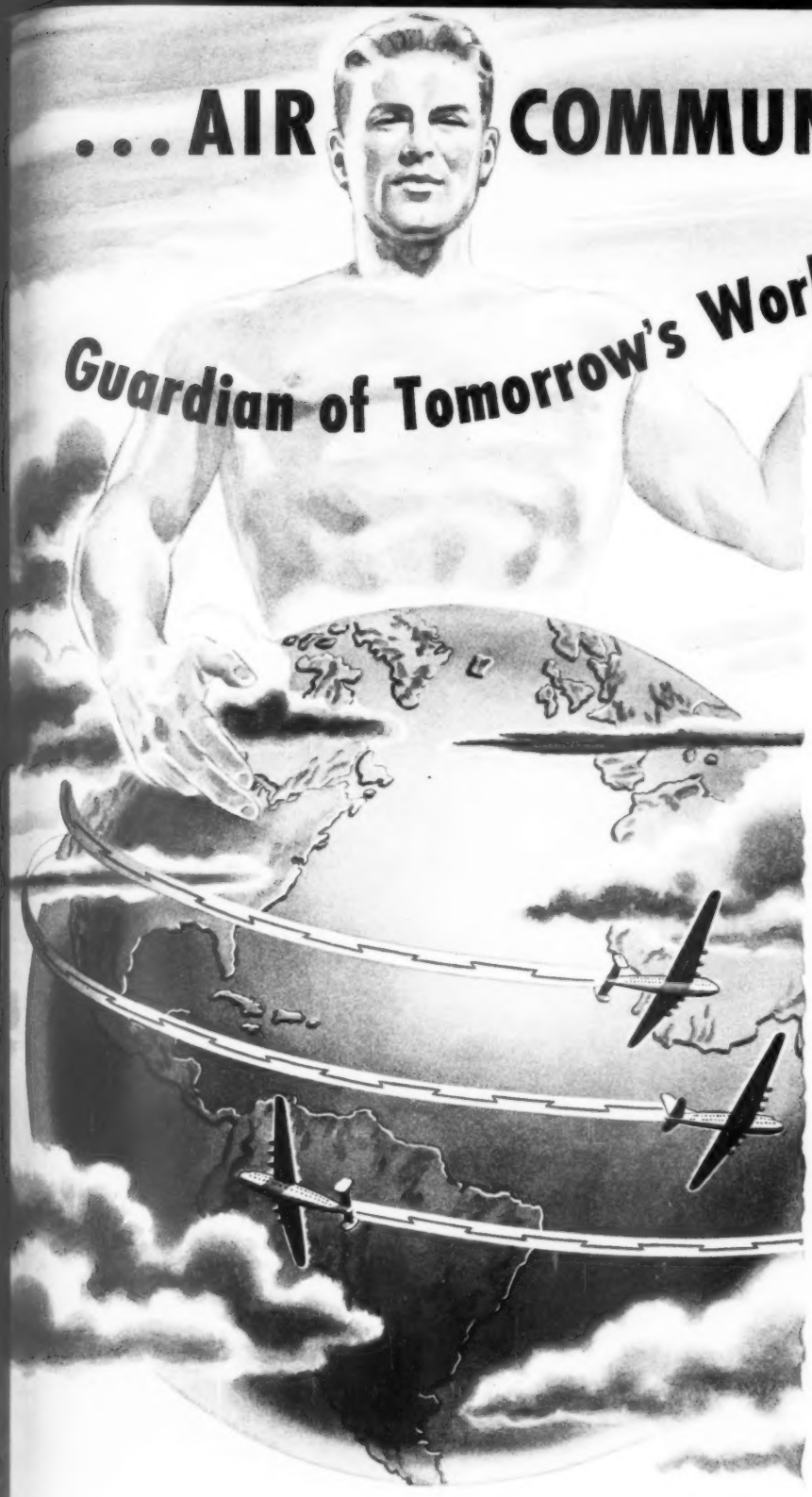

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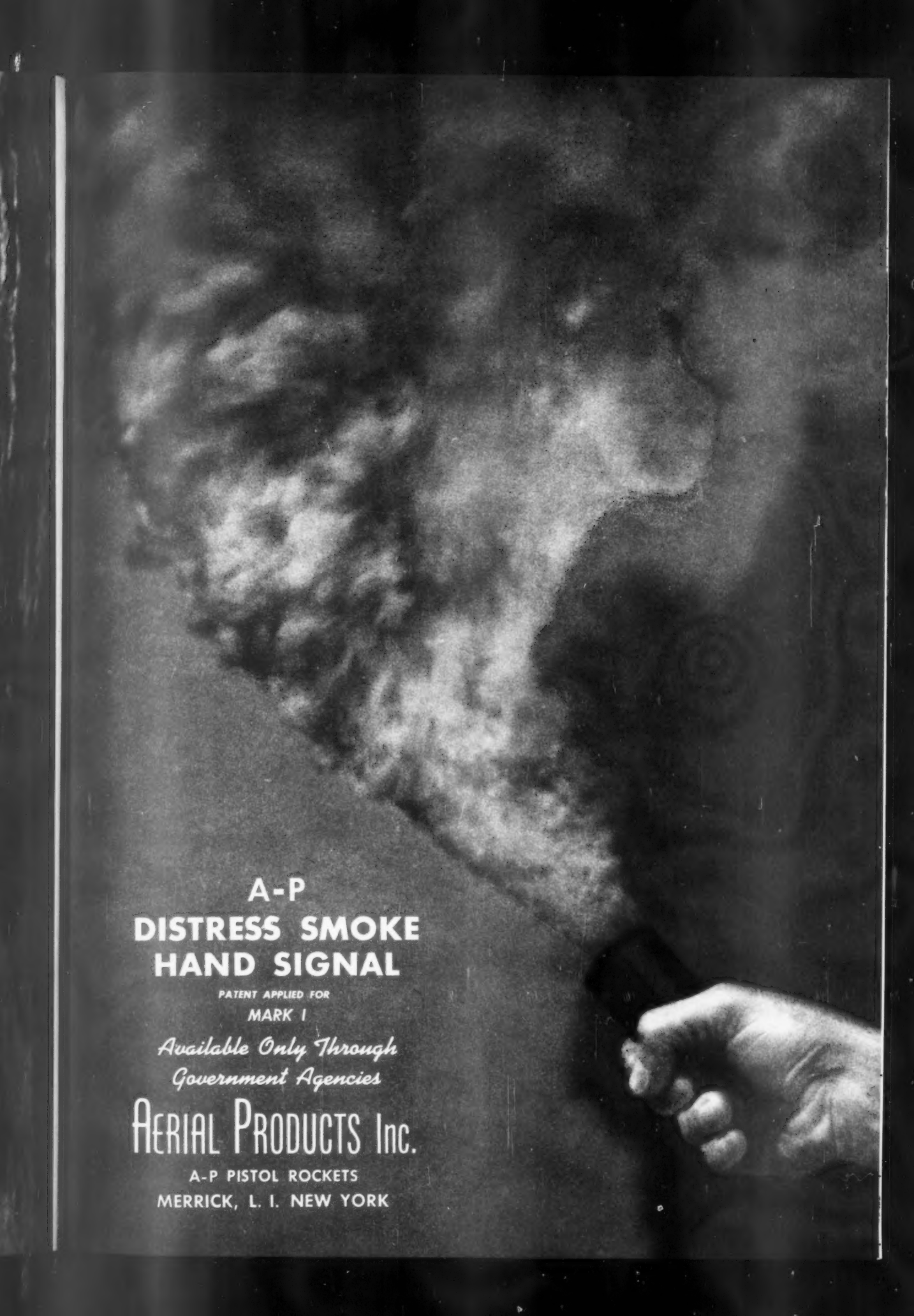
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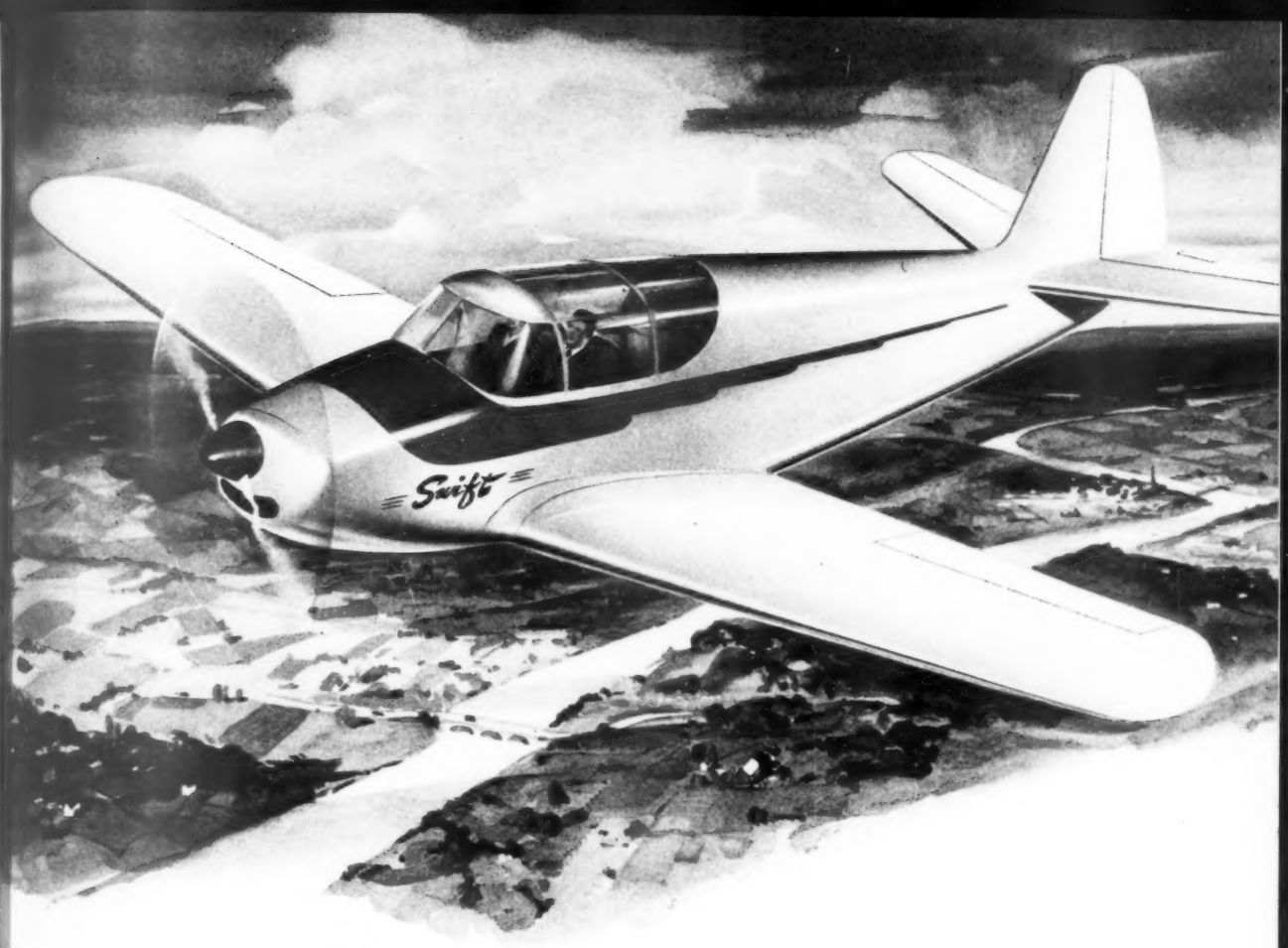
EVERY NAVY PILOT HAS STRONG MEMORIES OF THE 'YELLOW PERIL' PRIMARY TRAINER. THESE ARE BOEING KAYDETS AT CORPUS CHRISTI.



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Here is a plane you'll be proud to own . . . that's sporting to fly . . . and a plane you can afford. It's the ***New Swift,*** combining into a *safe*, easy-to-fly personal plane these *six* Big-plane features: **1.** Bubble-type canopy giving 360° vision . . . **2.** Extra sturdy, retractable landing gear . . . **3.** Airfoil empennage with dihedral in stabilizer and elevator . . . **4.** Flaps for safe, slow landings . . . **5.** Roomy, de luxe cabin . . . **6.** Advanced aero-dynamic design, with plenty of thrifty power. In addition, the ***New Swift*** offers you long range and speed for cross country flying . . . and it can soon be yours to enjoy . . . at less cost than you'd expect. The ***New Swift*** will be ready soon after conditions permit the manufacture of personal airplanes.

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"TRIUMPH" *Lifetime** pen, with clip, $12.50; pencil, $5. "TRIUMPH TUCKAWAY" model, without clip, for men or women, carries safely *in all positions* in purse or pocket—pen, $12.50; pencil, $4.

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New and deadly efficient . . . the P-61 is our Army's night fighter

The Black Widow is a new kind of fighter. It's big as a heavy standard transport and packs a crew of specialists.

It is equipped to track down enemy planes hidden in darkness, fog or rain—and literally blast 'em apart with its shattering batteries of 20 millimeter cannon and .50 caliber machine guns.

With the range of a medium bomber, the Northrop Black Widow has pursuit ship speed and climb. It can fly on just one of its over-2,000 h.p. motors. Special design features guard against spins and stalls on even the tightest turns. Also the Black Widow is built to take off quickly, land slowly . . . a valuable safety factor on small dark fields.

The P-61 is being turned out in quantity by the Northrop group. And as production rolls, Northrop is also working toward still more advanced designs and production skills for the future.

NORTHROP *Designers and Builders of the* ***BLACK WIDOW P-61 Night Fighter***

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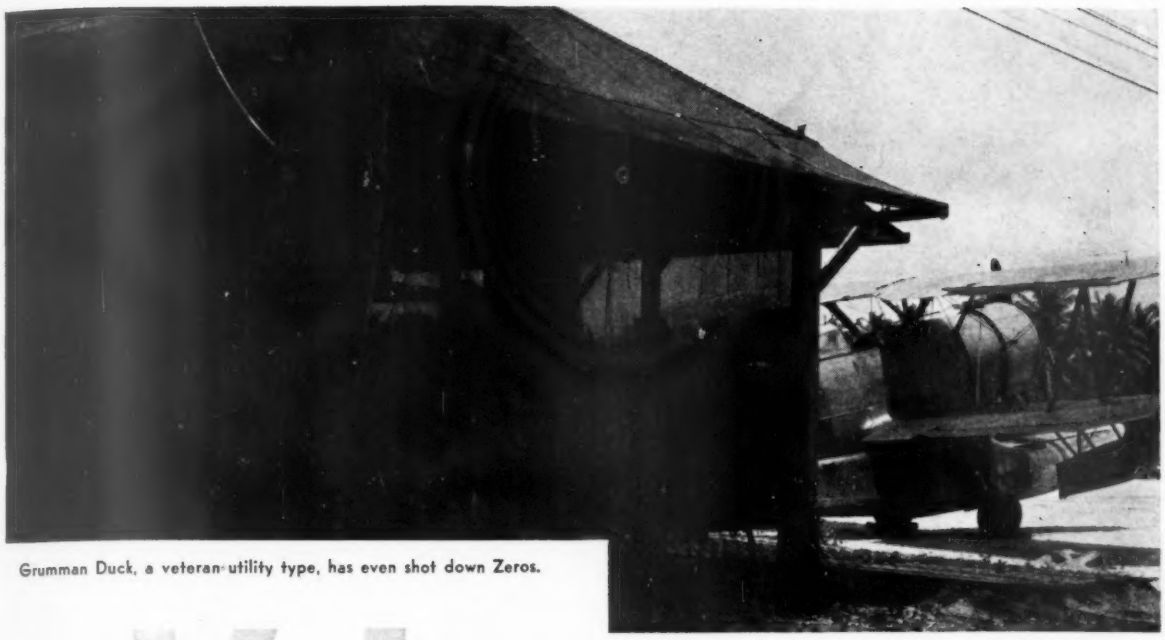
speed and climb. It can fly on just one of *tion skills for the future.*



Grumman Duck, a veteran utility type, has even shot down Zeros.

UTILITY VJ

Jacks-of-all-trades, the utility squadrons perform tough odd jobs that combat and transport groups cannot do.

THEY seldom win Navy Crosses, but the utility squadrons scattered throughout the South and Central Pacific are entitled to take a bow with many of the boys that do. One of the most important jobs in the combat areas is being done by these anonymous Naval flyers who lay the groundwork for a lot of the more spectacular aviation feats. For instance, if many of the utility boys didn't spend long gruelling days towing targets, combat pilots would have to jump into battle without a vitally necessary last minute brush-up on gunnery.

One advanced base utility squadron is composed of 40 officers and 400 men and uses just about anything that will fly—*Venturas, Ducks, Dauntlesses, Avengers,* and *Catalinas.*

The work of the units ranges from reconnaissance to rescues. The search at Tarawa, for example, was turned over to a VJ squadron for eight weeks. The utility people also rig up for pictures, tow targets for ship and plane gunnery, stage mock air battles for the fighter director experts, work for the searchlight drill people, do reconnaissance work, transport materiel into inaccessible areas requiring seaplanes and do just about anything that nobody else wants to do.

Every pilot in the squadron is able to fly all the plane types available. They are among the most versatile pilots in any air force.

Miscellaneous rescue work forms an important part of their assignment. Not long ago they went over to a neighboring island to pick up a native chief who had blown off his foot while trying to fish with dynamite. They brought him to a hospital at Espiritu, saved his life, and won the complete allegiance of his tribe.

Another dramatic rescue was performed by a young Navy pilot. Two Army pilots en route to Espiritu in *Warhawks* missed their terminus and made forced landings in the Torres Islands, 150 miles north, where they were located by search planes. The Navy flier departed in a Grumman *Duck* amphibian to return them to base. Penetrating a 100-mile wide front, flying 50 feet off the water in a driving rain, he arrived at Torres to land in an eight-foot sea off the beach. He was forced to cut his engine and lower his wheels as a sea anchor. Natives brought the Army pilots out in canoes; but the sea was so rough they were unable to come alongside; so the pilots had to swim up to the rescue plane. After this, however, the engine refused to start, and they began to drift down on a coral reef, with a heavy surf running.

With 60 fathoms of water at the edge of the reef it was impossible to anchor. But by good fortune a particularly heavy sea lifted the amphibian over the first reef just in time, and the engine fell into the swing of this new development by starting up. Keeping the power on, he waited for a large wave and used its lift to shoot over the outer reef into open water. Then he taxied four exceedingly rough miles around the island to a semi-sheltered area and took off for Espiritu. "The return trip through bad weather was without incident," he wrote in his report.

Rescue work is commonplace for the utility squadrons. They operate several hundred miles out to sea and usually are airborne within five minutes after the call comes in. They average a rescue and a half a week. Hauling medical supplies is also part of their job; recently they made a long flight to pick up a missionary and his wife and child all dangerously ill with malaria.

On occasion, the conditions under which they perform are rugged in the extreme. At one island there is no good landing and take-off area, but this factor has never deterred plane operations. Normal procedure is to have men hang on to a tow rope while the pilot guns the engine; then they let go simultaneously and the plane executes a quick get-away.

Makeshift operations are commonplace with the utility units. Since their missions are so varied they frequently must work out new devices to meet new situations. Fighter director practice is a case in point. This important work, it was found in the advanced zones, needs constant polishing under simulated combat conditions. To take care of this the utility pilots form into two teams, one representing the Navy and the other the enemy. The enemy team flies out a considerable distance and starts in. The fighter director group, generally based upon some ship, then attempts to scramble the Navy fighters in such a way as to make an interception.

Day after day the utility pilots tow targets, not only for flyers to practice on, but for ship's gunnery as well. A good

(*Continued on page 270*)

NATS

Skymasters share long-distance NATS work with Mariners, Coronados, and the Mars. Altogether, NATS operates 60,000 miles of routes.

Operating over most of the globe, NATS flies a million miles, carries nearly 2,000,000 pounds of cargo monthly.

NAVAL AIR TRANSPORT SERVICE has built a reputation for the variety of its missions. In its brief history of a little more than two years it has done about everything from supplying steel to a submarine to delivering airplane engines.

Between the two kinds of projects NATS chiefly is engaged in regular transportation service over virtually all the known world. It hauls Naval personnel and equipment wherever it is most urgently needed and where speed in delivery is a factor.

Capt. Donald F. Smith, USN, heads NATS. He is assisted by many former officials of commercial transport lines. While the service operates on schedule along regularly-defined air routes, the set-up is not so rigid that by-services cannot be included. From Montreal to Montevideo, from San Francisco to Sydney, from San Diego to Attu, from New York to London and Port Lyautey, NATS maintains a schedule as rigid as a railroad timetable. In addition to "trunk" routes, it has scores of feeder lines and temporary services between waypoints.

When a Nazi submarine shot an engine out of Lieut. Merle Taylor's bomber and he had to limp to Ascension Island and await repairs, NATS flew in a *Liberator* engine and a crew to install it. Or when a *Catalina* got down on a jungle-lined beach, NATS flew supplies to the crew until a crash boat came to the rescue. The word "service" in the name was not put in by accident. The organization is exactly what the name says it is—Naval Air Transport Service.

This world-spanning activity has involved the use of many different kinds of aircraft. At first it was necessary to employ what was available. As time passed, planes more suitable to the specific task were procured and put into service. The wheelhorse of the coast-wise work, naturally, is the twin-engined Douglas R4D, a converted DC-3 airliner popularly called the *Skytrain*. Martin *Mariners* and the *Coronados* which pioneered ocean operations now do the bulk of the flying boat work but share long-distance loads with the four-engined Douglas *Skymaster*. Leased services of Pan American Airways and United Air Lines bring other aircraft into action.

A recent development is the giant flying boat *Mars*. The initial performance of this big Martin transport prompted the Navy to order 20 more planes of similar size though with major constructional changes. These, it is anticipated, will be put to work in the Pacific where proponents of the flying boat find the strongest arguments for its use. Champions of the flying boat point out that many an atoll not physically large enough for a landing strip will support a refueling and servicing station for a line of flying boats which may be set down in the lagoons behind the omnipresent reef around the island.

NATS came into official existence on December 12, 1941, when it consisted almost entirely of the signature of the Secretary of the Navy on an order authorizing it. In a short time NATS was spreading over the world so rapidly that many Navy people did not recognize it as part of the Navy. The first news many outposts had of the Naval Air Transport Service was when one of the big transports came nosing over the horizon with a cargo of mail and other supplies.

In addition to pioneering a lot of good will for itself, the

organization now operates planes that fly more than a million miles per month. It carries approximately 4,000 passengers and nearly 2,000,000 pounds of cargo monthly, more than half of which is mail for Naval personnel in isolated places.

Among the toughest routes is the line to Alaska from Seattle. Weather along the North Pacific coastline has frequently been described as the worst flying weather in the world. Members of VR-5 claim this is an understatement. Lieut. Comdr. Jack Thayer said: "Look at me. You know why I'm flying an admiral in West Africa? Me, the best instrument flyer in the world? Well, I'll tell you why. After 19 months in the Aleutians they had to send me over here so I could brush up on my contact flying. For 19 months I didn't see a thing but my instrument panel. Then when it got too foggy to see my instrument panel, the Navy decided I better get over here where a man can see where he is. It's kind of nice, too, to be able to see again."

The service to Alaska was inaugurated nearly two years ago with few or no aerology stations, few landing fields, and practically no pilots with experience in flying that kind of weather. On this route, as on all other transport lines, the Navy first had to fly such planes as were available. But now, in the northwest as everywhere else in the world, our plane situation is different. A little more than a year ago, the first big Douglas *Skymaster*, the four-engined R5D-1, made the first trip across the gulf from Seattle to Kodiak, flying at 8,000 feet. The weather was good and the trip was made without unusual incident. Simultaneously, shorter-ranged twin-engined *Skytrains* (R4'D) made their way up the coast. While the big transport was enjoying fair flying weather, the smaller craft were plowing through fog, squalls, and bad icing conditions on instruments.

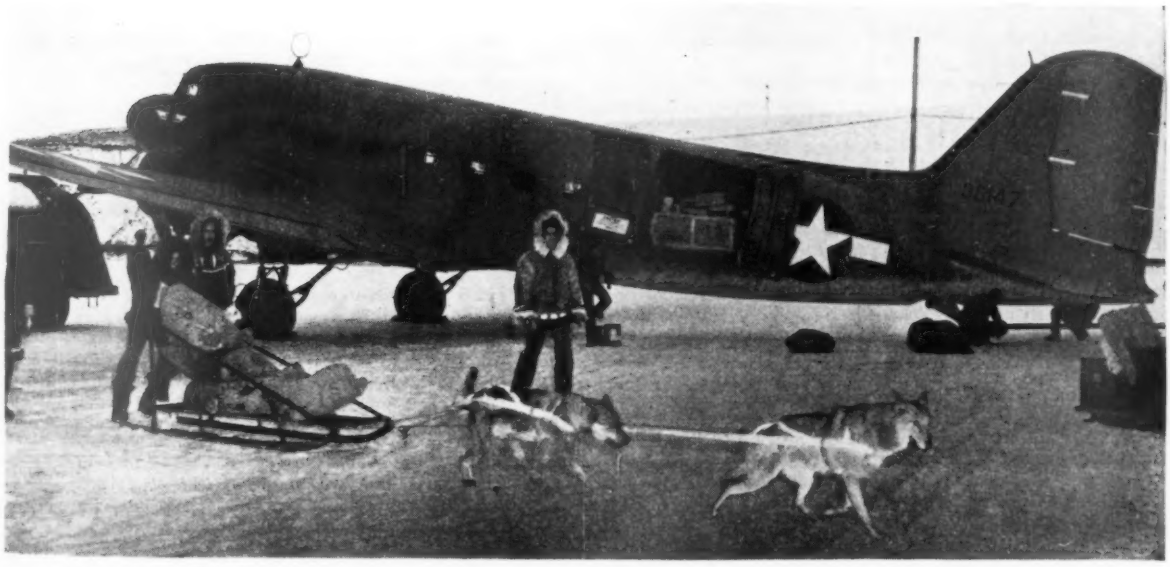
The use of the four-engined planes did not solve all the bad weather problems, nor do the increased landing facilities and better weather observation eliminate all the hazards. Always in the Alaskan country is the notorious williwaw. These meteorological freaks appear from nowhere, whirl in all directions simultaneously (including straight up and down) and then disappear into the nowhere whence they came. One grounded pilot saved his plane from williwaw destruction by commandeering several dump trucks and arranging them in such a manner as to spill the wind over the wings. Another pilot, who was in the normal process of letting down at Dutch Harbor, was caught in a williwaw. The plane was buffeted like a leaf. The pilot gave it the gun and a few minutes later landed in calm weather at Cold Bay, a normal one-hour flight away.

There have been remarkably few accidents. In spite of its

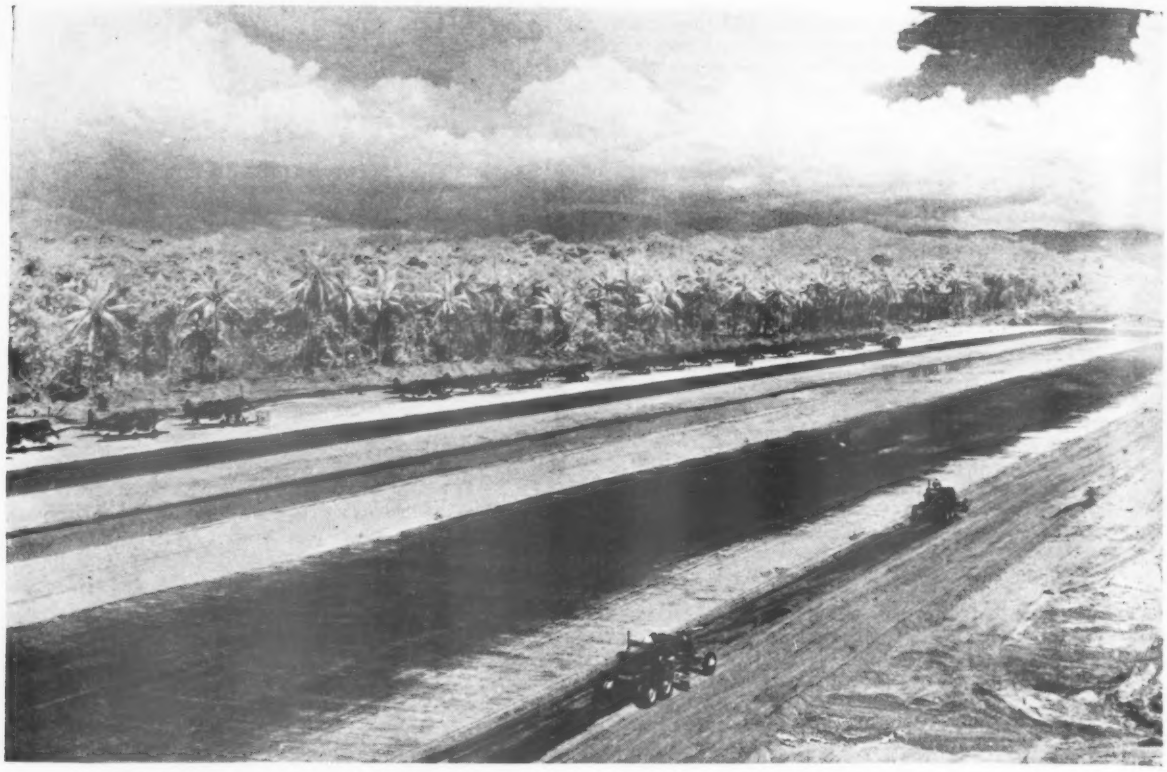
(*Continued on page* 236)

Coronado at Espiritu. It is the biggest flying boat in wide use.

Men must be really tired to sleep in bucket seats of NATS plane.



NATS Skytrain lands mail at Kodiak, Alaska, in weather so bad that dog teams must be used to haul it to the base post office.



Long before this Bougainville fighter strip was completed at Torokina Point, Marine Corps planes were using its metal mats.

THE MARINES

Navy-trained and equipped, Marine flyers are leading Pacific thrusts in their own deadly leatherneck fashion.

THE wartime activities of Marine aviation can be summed up in a few terse words: if there is an air fight going on in the Pacific Marine aviators are more than likely to be in it.

From Midway to Rabaul they have blasted the enemy where they found him. Their most spectacular work has been accomplished with *Corsair* fighters from tiny land bases in the South Pacific. But their dive bombing in support of attacking ground troops and against enemy supply lines has been equally effective. The Marines also supply most of the pilots for the SCAT transport planes, an operation which requires expertness, dash and vigor.

Marine flyers, like the ground troops of this world-famous fighting corps, operate under the general direction of the Navy. Their aviators are Navy-trained and Navy-equipped, but they add "a certain extra something" to their fighting that strikes dread in the Japanese. At Guadalcanal, where they were outgunned and outnumbered, they fought their way to victory and glory. At Bougainville, Munda, Vella la Vella, and dozens of other places, when equipment was better and more plentiful, they added lustre to their record.

The teamwork of Marine aviators is deadly. As individuals, their heroes are many and well known. Maj. Joe Foss and the late Maj. Gregory "Pappy" Boyington, each with 26 sure kills to his credit, are the leading aces as this is written. But any time these records may be smashed by some unknown pilot. The war is moving rapidly in the Pacific, and the Marine flyers are moving just ahead of it.

As the last Japs were rounded up on Guadalcanal during January and February, 1943, Marine fighter planes, dive bombers, and torpedo bombers soared from captured Henderson Field toward new targets further north in the Solomons. The Russell Islands, 65 miles north of Henderson Field, were occupied without resistance. A fighter field from which Marine *Corsairs* could pick up and escort bombers further northward was hacked from a coconut plantation.

On several occasions large flights of Jap bombers escorted by swarms of Zeros tried to penetrate the air fortress around Guadalcanal. Memorable among these attempts was the raid in early April of 1943, the day Capt. James "Zeke" Swett, blasted seven Jap dive bombers out of the skies over the Tulagi shipping area in a single flight. The enemy approached Guadalcanal and Tulagi from various directions and altitudes, but only a few got through the protecting umbrella of fighters.

During April, May and June of 1943 dive bombers and torpedo bombers plastered Jap strongholds at Munda, Kolombangara, Rekata Bay, Ballale, and southern Bougainville. Jap barges carrying troops and supplies between islands in the Central and Northern Solomons were sought by Marine fighters. Occasional Jap warships, escorting supply and cargo vessels, clashed with U. S. Naval forces and later were chased by Marine dive and torpedo bombers.

Not to be forgotten were the Marine-flown SCAT transport planes which continually brought in fresh pilots and ground crews with valuable cargo to relieve those too long in combat.

Larger and larger numbers of planes were being made available on Guadalcanal and in the Russells. Guadalcanal alone had two new fighter strips in addition to Henderson Field, and a second strip was constructed in the Russells.

On June 16 the Jap air force struck at Guadalcanal with an estimated 120 bombers and fighters, but the attempt was even less successful than the early April raid. More than 75 of the enemy planes were destroyed.

On June 30, Army infantry troops and Marine jungle fighters landed on three strategic points in New Georgia in the Central Solomons. The main landing was made on Rendova, a small mountainous island seven miles across the channel from the Jap stronghold at Munda airfield. Several days after the Rendova landing American troops established a beachhead at Zanana beach more than two miles up the coast from the Jap-held airfield. The enemy fought a delaying action for more than a month, doing his best to hold the airdrome.

In the air over Rendova and the Munda beachhead, aircraft performed the amazing feat of supplying a protecting umbrella from dawn to dusk for more than a month. At approximately 11 a. m. of the day of the landing on Rendova the first flight of Japanese planes attacked. Allied fighter umbrella cover over New Georgia intercepted the oncoming enemy and terrific dog-fights followed. The first raid was beaten off, but twice more during the day the Japs came in with dive bombers escorted by Zero fighters. On one occasion the enemy planes sneaked through in sufficient numbers to sink a transport. Two Marine fighter squadrons roared into action from the strip in the Russell Islands. In the gigantic air battle which followed these two Marine squadrons shot down 31 Jap planes, seven probables and five smokers.

Pilots of these squadrons participated in four patrols during the day. In the first battle of the morning 14 fighters from one of the squadrons encountered 40 Jap Zeros just as they arrived over New Georgia. Although outnumbered three to one the Marines shot down 13 Zeros in a running battle which lasted less than 20 minutes. Four Marines were shot down in this air battle but two pilots parachuted to safety and were picked up by a task force below. Eight planes from one of the squadrons arrived over Rendova late in the afternoon, just in time to take part in the tail-end of the second battle of the day. Before heading home for refueling they had shot down four more Jap planes, three of which were twin-engined Mitsubishi bombers, the fourth a Zero. In the final air bout of the day members of the squadrons contacted an estimated 27 Jap twin-engined bombers attacking Allied shipping off Rendova. As the Japs approached the ships in waves of nine each, the Marine fighters dived for the kill. Twelve of the bombers were blasted out of the skies and two protecting Zeros were shot down. All our fighters returned safely. Capt. James Swett, who had shot down seven planes in one flight, upped his score by downing one enemy fighter and one bomber.

The attack on the Central Solomons commenced one of the toughest battles Marine pilots had to fight in the air over the Solomons. A constant air umbrella had to be maintained over the shipping and troops in the New Georgia area and pilots were forced to fly extremely long, tiring patrols. Capt. Perry L. Shuman of Lakeland, Fla., who had always claimed to have more hours in a combat zone and less to show for it than any other member of his squadron, got three Jap Zeros in a row. "I had seen pictures, charts and movies of Zeros till I knew them better than my own plane," Captain Shuman said. "As we reached New Georgia, we got a radio warning of approaching Japs." He spotted two Zeros working over a disabled Marine fighter. With a short burst he quickly nipped the career of one, which burst into flames and tumbled seaward. He then followed his second Zero from 15,000 feet to sea level in a rocket dive before he landed a long burst that sent the Jap down. He barely missed following his victim into the water, pulling out with only feet to spare. On returning to the fight high in the skies he again spotted two Zeros attacking one plane from his squadron. He quickly turned and fired, and one of the enemy planes blew up. The other streaked for safety.

On the second day of the New Georgia campaign enemy airforces made only one attack and that with little effect. During these two days 125 enemy planes were destroyed against a loss of 26 of our fighters, with only 11 pilots missing.

During these days Marine pilots performed numerous amaz-

Corsairs of the famed Blacksheep squadron over Bougainville.

Marines now fly heavily-armed Mitchells (PBJ) against the Jap.

ing feats, but outstanding among these was that of Maj. Gregory J. Weissenberger, of La Crosse, Wis., who shot down the enemy plane which forced him to bail out of his own plane, wounded. In the aerial conflict which occurred on June 30, Major Weissenberger shot one Zero down and, while he was destroying a second one, a Jap got on his tail and riddled his plane with bullets. The Marine ace's plane began to pour smoke and flames and started to go down. As he was falling, the Major saw the Jap plane which had got him swing off to the right. He tried his machine guns and they still worked. Determined to get the Jap, he swung on the tail of the enemy fighter and poured him full of lead. The Jap plane exploded and fell in flames, and Major Weissenberger bailed out of his flaming fighter. He was picked up in the water by an American destroyer and treated for injuries he had sustained in his left side.

While the ground troops fought it out with the enemy for Munda airdrome, Marine flyers clashed day after day with the Japs overhead. In addition, ground forces received the never-tiring support of Marine dive bombers and torpedo bombers. Infantrymen could often look skyward and see raging dog fights as Allied fighter planes fought off attacking bombers and fighters. At the same time, they could see Marine dive bombers smashing Jap strongholds on the front lines. Torpedo bombers maintained a continual artillery fire-spotting patrol over enemy strong-points directing our "Long Toms" and large howitzers.

In early August Munda airdrome was captured, and in a few days Seabees had rebuilt the strip suitable for operational purposes. Artillery was still pounding away at the retreating enemy when the first flight of Marine *Corsairs* landed on the field. Soon afterwards, enemy artillery found the range of the airdrome and peppered away for a week. The shelling did little damage. Once Munda was captured, Allied forces found it much easier to maintain aerial superiority over the Central Solomons.

On Kolombangara, just north of Munda and in the New Georgia group, an estimated 10,000 Jap troops were well dug in. Following the fall of Munda, however, infantry troops rushed ashore on Vella la Vella, an island north of Kolombangara, thus cutting off the supplies of the Kolombangara garrison. While a fighter strip was being built on Vella la Vella, a fighter umbrella had to be supplied from Munda, and convoys bringing these ground elements food and ammunition also had to be protected. These were the responsibilities of Maj. Gen. Francis P. Mulcahy, U. S. Marine Corps, commander of the New Georgia Airforce, and they were carried out by Allied flyers. The enemy garrison on Kolombangara endeavored to escape by barges to Choiseul, but was constantly strafed by American fighters. Since then Kolombangara has been entirely cleared of enemy forces.

Once aerial superiority was gained in the New Georgia area, Marine aviation carried the fight to the enemy in the skies over their most powerful airdromes in the Solomons—at Bougainville. Jap fighters, in particular, were still operating from the airfields at Ballale and Kahili in large numbers, and the next task of Allied aircraft was to knock out these fields. In addition to escorting Army heavy and medium bombers over Bougainville, Marine *Corsair* fighters carried out dangerous strafing missions. While on one of these missions 1st Lieut. Alvin J. Jensen, of Clemson, S. C., singly destroyed 24 Jap planes. The story is told in the citation presented to Lieut. Jensen with the award of the Navy Cross. The citation reads, in part:

"For extraordinary heroism and distinguished service . . . He continued on alone to attack the airfield, dived through enemy antiaircraft fire, strafing and exploding a group of 12 enemy bombers, four dive bombers, and eight Zeros, leaving them burning on the field. His courageous conduct in pressing home this devastating attack against great odds was in keeping with the highest traditions of the United States Naval Service."

Marine dive bombers and torpedo bombers sought out individual targets on southern Bougainville and swept in at treetop altitudes to destroy them. Antiaircraft batteries on Ballale, searchlights, beach emplacements, and other strongholds were the main target of these planes. As days and weeks went

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By the jeep-load, VMF-222 pilots taxi to Bougainville strip for take-off on the next leg of their drive toward Japan—Rabaul.

Members of New Zealand anti-submarine patrol squadron under U. S. Navy command repair Dauntless dive bomber at Southwest Pacific base.

ONE ALLY

New Zealanders under Navy command have run up a remarkable record against the Japs.

Squadron Leader Arthur Greenaway

IN LATE November of 1942, a group of rather informal young men arrived at Tonga Island from New Zealand. They said they had heard that a lot of antiquated *Warhawks* were sitting around idle and they wanted to form a fighter squadron and join up with the U.S. Navy.

On the basis of past experience, the Navy commanders were delighted. New Zealanders they'd had dealings with in the war had been sensationally single-minded about the Japs.

The *Warhawks* given to the New Zealand deputation at Tonga had sensibly been abandoned some time before by transient Army squadrons. The exact condition of the planes is difficult to describe, but a Navy flyer made an attempt by saying, "No self-respecting crow would have risked flying in one, even with a parachute." In any event, the New Zealanders, aided by the Navy, went to work with amazing mechanical ingenuity and before long the planes were taking to the air, singly and in groups. Some of them did creak, groan, rattle and even make slight flapping motions with their wings. But they were undeniably airborne.

Instructors were assigned by the Navy to train this new fighting squadron in U.S. tactics, maneuvers and other fighting techniques. As the training progressed—with notable success—more New Zealanders came up from their nearby homeland into the New Hebrides and Solomons. These were assigned to Navy dive bomber, torpedo, patrol and other groups that were forming and training in the area. Within a short time the Navy, Marine and Army air units in the Solomons had been substantially reinforced by an ally who was to develop into one of the Japs' most dogged enemies.

On every hand the New Zealanders displayed a spectacular animosity toward the Japanese—something which may be explained by the fact that the Japs had struck so near the islands of New Zealand and had broadcast such interesting plans for their disposition. Roughly, the people of New Zealand were to be impressed into peonage, the women used to entertain Jap soldiers and the lands milked of raw materials and produce.

The New Zealanders, according to the air representation in the Solomons, had an entirely different idea about the future of their country. The fighter squadron at Tonga was joined by a couple of others, all equipped with cast-off *Warhawks*, and they soon moved into the fighting at Guadalcanal. Almost immediately they began to stand out. The Japs, always baffled by anything new, were unable to get accustomed to the rather peculiar off-hand recklessness of the New Zealanders. Squadron Leader Herrick, DFC, for example, spied a group of Zeros one afternoon and plunged into the middle of them single-handed. His act was considered so foolhardy by the Japs that they promptly left for home—that is, all except one, which Herrick knocked down on his first pass.

It should be explained here that although these New Zealand additions to our Pacific air force averaged about 22 years old, many of them were veterans of four years fighting—in England and other places. Having joined the RAF early in the war, they had fought the Germans until their homeland was threatened by the Jap thrust at Pearl Harbor; then they had resigned to return and fly in their own front yard. Squadron Leader Herrick, like some of his colleagues, has the DFC as a memento of his RAF experiences.

From Guadalcanal, the New Zealand fighter squadrons went north to Ondonga, where they performed brilliantly. Then they were designated as the fighter cover for the raids on Munda. This virtually amounted to an admission by the Navy that the New Zealanders had learned our fighter business as

(*Continued on page 254*)

Decks loaded with Wildcats and Avengers, such Navy carriers as this CVE have all but driven enemy submarines from the sea.

HUNTING THE SUB

The airplane and escort carrier have had a tremendous part in defeating the U-boat.

AIR PATROL against submarines is exacting, tedious work. Hunting and attacking submarines in aircraft involves precision flying and navigation, an expert and versatile crew, and a cool, level-headed pilot who has both flying experience and common sense. Most of all, it requires patience and persistence.

Day after day, in all sorts of weather, the pilot and crew keep vigil. Often they see nothing but the surface of the water. Usually it is late when they come back. They have their chow, which has been held over for them from the regular six o'clock supper hour. Then they take a shower and fall in the sack. There is very little conversation. Newer members of the crew may say some wistful something like, "Well, the next time we'll get one." Old timers merely stare at the greenhorns and remain silent. Just what a successful strike means to these men can be revealed only in the way they minimize the importance—and danger—of their work.

Thus, a blow-by-blow account of one submarine patrol that was flown last February by two Navy *Liberators* commanded by Lieut. Comdr. P. K. Blesh, USNR, would run something like this: Communications sent the message to the skipper at 10 p. m. at the officers' club, which is a long, narrow temporary building divided into a bar and recreation rooms.

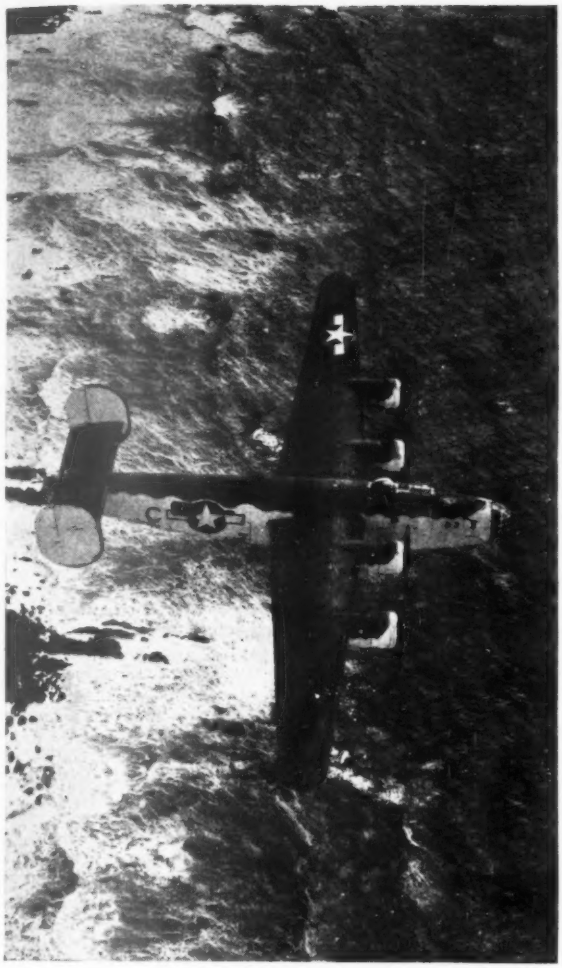
The skipper and the two pilots went to the operations room, where they went over all the available information for the patrol. Then Lieut. William Daniel Deibler and Lieut. (jg) C. I. ("Zoom") Pinnell, the two pilots, studied the latest weather information and went to bed.

Early next morning, the two pilots came back by operations and picked up their course charts and other available information, including developments in the weather. They had breakfast and rode out to the air strip with their crews in station wagons and jeeps.

Pinnell, the junior, took off first. His plane already had been serviced by Hedron (headquarters squadron) and warmed up by his own crew. Deibler's plane followed. Presently there came a sound from the nose. It was a noise like somebody beating on a rusty tin dishpan with a butter paddle. Presently a fainter sound, but of similar timbre, came from far back in the tail, and then from the top turret a brief sputtering sound, with empty cartridges and clips flying about the radio cabin.

On the intercommunications phone to the pilot came the report: "All guns in order, sir."

Dramatic photos of a submarine being sunk by planes from Escort Carrier "B," scene shows sub blasted to surface out of control.



Navy "Lib" crosses English Coast for patrol over Bay of Biscay

Not long after take-off both planes got to the misty, cloudy area known as the "tropical front." Pinnell started straight through it, but an up-draft immediately lifted him 1,000 feet in less than 60 seconds. He radioed Deibler: "Better climb, it's a mess."

Pinnell's plane soon after reached the point from which he would change course and turn due east. His plane had flown approximately 500 miles and there had not been a single "Roger" or "Wilco," those two staples of Navy radio talk, yelled through the communication system.

Deibler flew on past the point where Pinnell had turned, and made his change in direction. Naturally the two pilots had many pre-arranged understandings worked out—when to observe radio silence and what each would do in any emergency. Things had been understood between them so long that it was unnecessary to go over them each time they took off.

About mid-morning, Anderson, Pinnell's lower bow gunner, announced in the intercommunications phone: "There's something over yonder—70° off starboard bow."

Pinnell's plane, the *Passarola*, was cruising at approximately 145 knots, clouds were 3/10 cumulus at 2,000 to 3,500 feet, and the plane had just emerged from a cloud bank.

"That," said Pinnell later, "is where all your training takes over for you. You don't have to stop and think about what to do. There isn't really time."

He ordered "all hands man battle stations," nosed to the starboard 70°, stepped up the revolutions and went into a glide. The submarine was approximately 12 miles off, running full surfaced at right-angles to the course flown by Pinnell. The radio man called the base.

"I don't think they saw me until we were just a little way off them," Pinnell reported. "I maneuvered around until I was almost directly head on—just a little off the port bow."

The submarine's antiaircraft 20-mm. opened fire on the plane and the bow gunners opened with their 50's. As soon as the *Passarola* guns cut loose, the enemy's antiaircraft stopped. The *Passarola* whizzed over and dropped depth charges on the submarine.

"*Heavenly days!*" said Pinnell, in good old-fashioned, seagoing accents. "I dropped too soon." He climbed again, flew back, and dropped more depth charges on the submarine.

As it turned out, Sheadeker, the plane captain and photographer, got 10 excellent pictures of the first pass—Pinnell had not dropped his depth charges too soon; he had straddled. Bombs landed on the near side of the sub and beyond it—a lethal load on anybody's U-boat! Furthermore, on his return trip he got a straddle from his remaining bombs—practically perfect bombing.

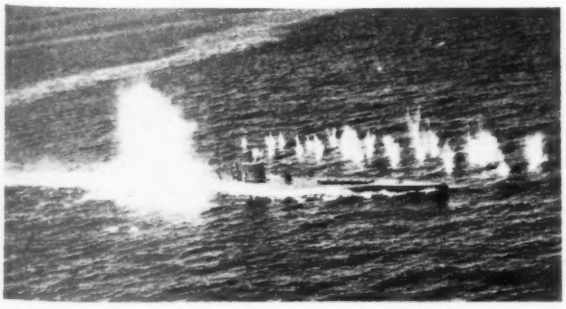
Sheadeker reported later that while Pinnell was so desperately eager to get back and correct for what he considered his first bad release, German crewmen and submarine fragments were flying through the air like autumn leaves. His report was verified by the pictures which were developed after the mission was over.

On the return run Swanson and Anderson reported that the submarine had completely submerged. Pinnell and the co-pilot both thought they saw it in the disturbed and oil-coated water. (One photograph showed a hunk of the bow sticking out of the water at about 30° angle to the surface.)

After the second drop, the conning tower appeared and started a slow turn to starboard. Sheadeker reported seeing "about 50 men floating in the water," and kept right on snapping pictures as the plane drew away.

Pinnell made a slow turn, passed over again at 40 feet altitude, and dropped a life raft. He then made another turn, passing over once more, and this time he saw survivors climbing aboard the raft.

"Take a fix" he told the navigator over the phone, and then he radioed his exact position to the base. His day's work, a rather substantial one, was done. END



Strafing from attacking plane keeps crew away from submarine's guns. The white plume shows depth bomb exploding near U-boat.

It's all over now. Plane circles but the sea is calm and the water has closed over sub. The Navy lists it as a "sure kill."

SEARCH

Navy search planes fly regular patrols from South Pacific bases. Big ones like the Lib can defend themselves against attackers and drop a few bombs in addition.

Liberator sets out on search mission from South Pacific base.

THIS is the story of a "triangle"—but not the common domestic variety.

It's a cartographer's triangle; drawn upon a map of the Southwest Pacific by tracing a line from Munda in the Solomons, up past the Admiralty Islands, over eastward to Nauru, and back home to Munda.

Within its confines are two squadrons of Navy *Liberators* and, once upon a time, a goodly quantity of Jap barges, Jap Zeros, Jap warships, Jap-held islands, and just plain ordinary Japs.

So this is also the tale of Navy *Liberators;* the search planes which fly a lonely course for several hundred miles out from Munda and then back again, covering every wave in the watery triangle. It is the story of a key operation which helped starve the Japs out of the Solomons, reduce their strength, and drive them westward.

Like the Dumbos, the search pilots and crews are under Commodore George Henderson who relieved Admiral Kendall, organizer of the two activities, as ComAirMunda. It all began back in April, 1943, at Guadalcanal and Espiritu. Then Munda became the headquarters for the *Liberators,* or "Box Cars," as the Navy crews dub them, and there begins the story of the triangle.

Out from Munda every day go 10 of the big *Libs,* each manned by a pilot and co-pilot, two radiomen and six gunners. Flying a segment of the South Pacific triangle, they have a look for Jap shipping and keep an eye on what's going on.

Among other things, the searches intersect the shipping lanes from Truk to Kavieng, which is the key to the Jap route to Rabaul. At Nauru, the *Liberators* look at what is coming from the Marshalls, a traffic now practically non-existent. Through the reports of the search planes, the Navy interrupted the nightly Japanese barge traffic, once estimated at 800 or 900 barges.

Each Navy crew makes several flights a month. The Navy search *Liberators* may carry up to four-ton bomb loads. In addition, they are armed with .50-caliber machine guns which make the Jap Zeros very cautious about coming in. The *Liberators* have no blind spots.

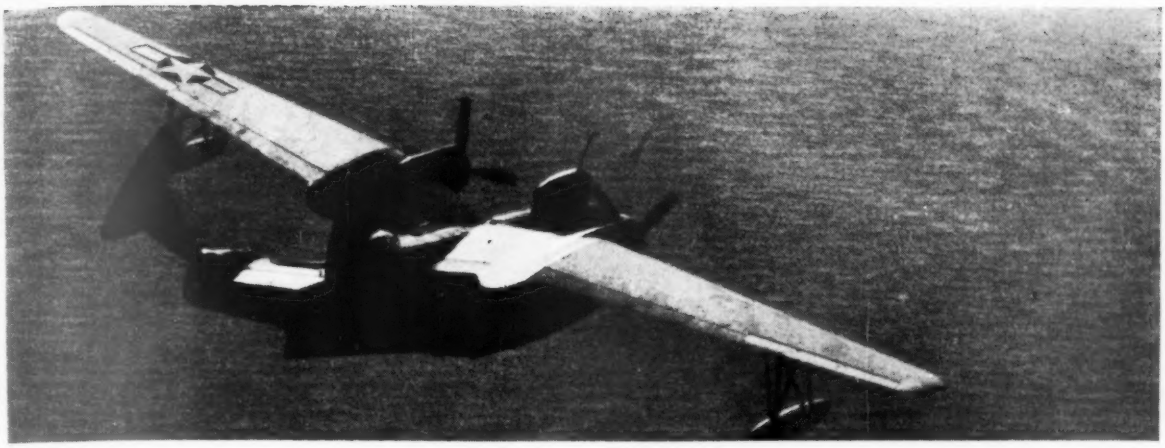
On occasion the boys take a crack at Truk, once proud and supposedly impregnable Japanese naval base, which is approximately 40 miles on from the end of the middle sector search. Just to relieve the monotony before starting the long trip back to Munda, the "Box Cars" have a look at Truk, drop a bomb or some empty beer bottles.

At one time the *Liberator* pilots used to do a lot of "flat hatting" (flying low just for fun) around Choiseul, where there still are a good many Japs. The spotters got to reporting them, however, even to sending in the number of the planes, they flew so low. So the crews had to abandon this enterprise because of official reprimands. Most of the fun took place on the way home from searches in that region, skimming over the tree-tops and shooting up the Jap villages.

"Every time anything happened after three o'clock over there they knew it was us," one pilot reported.

Chief hope of the Navy searchers, of course, is to locate and report an enemy convoy—a major task force. Penetration of such Jap units has been discouraged on several occasions by an alert Navy search plane spotting the enemy fleet.

Sector No. 1, up the east coast of New Ireland past Kavieng and beyond, is regularly the most exciting search for the planes operating out of Munda. This sector covers the Jap shipping



Twin-engined Martin Mariners, also used in South Pacific search operations, are bigger than beloved Catalinas of "Dumbo" fame.

lane heading down to Rabaul. At Nauru, too, which is extremely well defended by guns so powerful that ships sometimes have been hit eight miles away, the going is often hard. Two *Liberators* have failed to return from Nauru searches. One was believed to have been the victim of an enemy fighter plane, the other of ack-ack. Of late, however, the Nipponese fighters haven't come up to the attack despite their eagerness to hang on to the rich phosphate deposits there.

There seldom, if ever, has been a really concerted Jap fighter assault on a *Liberator* operated by Navy search pilots —a determined attack that kept boring in.

Typical of the Navy search plane captains is Comdr. Harry E. Sears, skipper of Squadron 104. A graduate of Annapolis

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Search operations can be extended hundreds of miles when new bases are captured. Liberator, above, is on Kwajalein airstrip.

Black Cats from Munda start out at dusk for night search of Jap shipping. They will stay up until other Black Cats relieve them.

In hot afternoon sun, Navy enlisted men load bombs on carts for transporting to Black Cats waiting for night—and Jap targets.

BLACK CATS

Heavily-armed Catalinas, painted black, bring something new to night warfare by teaming with PT boats to drive Jap shipping from the ocean.

ALONG the new coral roads of the South Pacific the air is quiet and sullen. Great black-fox bats hover above the banyan trees, looking as sinister as something out of Dracula, but actually benefiting the fighting men in the unfriendly tropic jungle. The bats prey upon the pestiferous insects—the mosquitoes, gnats and disease-bearing bugs that fly the air.

On the nearby airstrip is another kind of bat-like creature—the biggest, blackest, most sinister looking bird that flies. It, too, preys upon unfriendly insects. It is the famous Black Cat, an amphibious Navy *Catalina* (PBY-5A) painted dark for night work. Its chief mission is to hunt down and destroy the pestiferous night-creeping Jap barges that seek to reinforce and resupply the enemy.

Black Cats taking off for a night mission are an awe-inspiring sight. Generally, they leave around dusk and soon disappear from sight. The Japs probably will never see them. But they will feel them. For this new version of the PBY now is heavily armed and goes on deadly missions. Working with destroyers or PT boats, they make the night unsafe for Jap supply barges. Before they glide in again at dawn, more than one shattered and burning hulk will indicate that the Japs in some area are in for a hungry time.

The Black Cats, as Comdr. C. F. Coe of ComAirSoPac named them, have this in common with all versions of the PBY: they do a little of everything. Even now when the war is becoming more specialized, with Navy *Liberators* handling the search and Dumbo taking over rescue, the Cats still perform all these duties and many more. They have been used for mail runs; flown regular search missions; done anti-sub work; and acted as spotters for artillery fire, telling the ships how they are doing. Frequently they act as guides for lost planes. Not long ago two *Avengers* were lost after darkness fell. A Black Cat went out and lighted the way home, dropping flares at three-minute intervals.

These night prowlers—which have names like *Black Mac* and *Night Raider*—do a lot of miscellaneous rescue work. One Black Cat on routine flight from Espiritu Santo to Guadalcanal landed at sea to pick up the pilot of an Army *Airacobra* southeast of Cristobal. The Cat's retractable landing gear makes water landings slightly more risky. So, before the heavily-loaded plane dropped down, the pilot was forced to jettison 14 cases of priceless beer. Beer, though never consumed in the planes, serves a double purpose: it provides a pleasant inter-

Black Cats pulled up on newly-constructed South Pacific airstrip warming up for night flights which are scourge of Jap shipping.

lude for hot afternoons at the base and the bottle, carefully preserved to be dropped over the Jap encampment on the way home, becomes a screaming weapon of warfare to harass an enemy already overtired. The falling bottle gives out a weird, soul-searching, whistling scream. It annoys the Japs considerably.

The first plane to land at Green Island was a Black Cat which answered a hurry call to Torokina, on Bougainville Island, scenting big game. But it was only to haul passengers. However, when the crew members were told *what* passengers, they scrubbed the metal work inside that plane till it sparkled; they brought in settees and cushions; and they turned the tiny interior into a miniature parlor car. Nothing, they felt, could be too good for Admiral Halsey, Admiral Fitch and Brigadier General Riley. Admiral Fitch took the controls himself most of the way. After the party had made an inspection and returned safely, the Cat headed for base, happily strafing the Japanese-held coast and reporting some mines spotted near the Shortlands.

One big rôle of the Black Cats, as stated previously, is now to track down and destroy barges. Recently both the Cats and the PT boats have entered an impromptu armament race with the Jap supply-runners. At first the barges were duck soup; then they put on more guns. So the PT's added more, too. After this, the ordnance men got in a huddle to see what more the PBY-5A could carry. Consideration had to be given to the design of the plane itself. The *Catalina* is a big plane with two 1,200-h.p. Pratt & Whitney *Twin Wasp* engines, a wing span of 104 feet and a wing area of 1,400 square feet. She weighs over 20,000 pounds empty and can carry a load of approximately 15,000 pounds. All this had to be figured into the armament calculations. Already the *Catalina* had .30-calibers in her nose and .50's in the two blisters, besides a .30 in the tunnel hatch. She carried around a ton of bombs, numerous fragmentation bombs, many illuminating flares and a generous supply of the terrifying empty beer bottles. With her gas load, that added up to more than 34,000 pounds. What about more .50's? And couldn't you take out some of the light machine guns and put in a couple of 20-mm. cannon? One crewman, experimenting on his own, tried to install a 75-mm. cannon he

(*Continued on page* 300)

Bougainville briefing. Black Cat squadron group reviews plans.

The Jap pilot has a predilection for needless aerobatics, is a notoriously poor shot, but has much fanatical courage.

THE JAP

Our Pacific enemy is a fanatic with a one-track mind that has lost this war for him.

ON A RECENT morning at Bougainville a lone Jap fighter plane showed up over the island and, surprisingly, began stunting around. This struck several Americans and New Zealanders on the ground as quite foolhardy so a Navy pilot promptly went up and shot it down. The plane made a cheerful splash a few yards offshore but the Jap pilot, unhurt, shortly came bobbing up again. Dragged up to the beach he turned out to be an unusually gaudy member of Hirohito's air forces. His rank was a major and he was wearing, instead of the customary flying suit, a gorgeous black silk robe. His undergarments were equally plushy and his attitude was superior, if a little puzzled. The major was questioned at length by the intelligence officers who were naturally curious as to why he had made his rather unsuccessful visit. Unlike most Jap officer prisoners, the major spoke with great candor. "Me come over," he said in his fine liquid English, "to see why Jap flyers no come back."

This incident is important because it suggests that the Japs are no longer as cocky as formerly. The major got his answer in extraordinarily quick shape, but he won't be in a position to report to his colleagues for some time. The fact is, the Japs are getting a little depressed over the indifferent luck they are having with American pilots. Over Rabaul during January, Navy, Marine, Army and New Zealand pilots knocked down 500 planes and lost fewer than 100. This represents a ratio of about five to one, which is especially impressive, considering the bitter fighting over Rabaul.

During the past year and a half the character of the air fighting against Japanese, particularly in the Solomons, has undergone great changes. When Capt. Joseph Foss and his teammates were battling against the Japanese over Guadalcanal we were fighting a defensive war, hanging doggedly onto whatever island bases we had managed to muster in the first few months after Pearl Harbor and Midway. Consequently, although numerically in the minority, we had the advantage of fighting over our own home ground. The Japs came down each day, had a look around, dropped a few bombs and several planes, and limped home again. Gaining offensive strength, we moved north in the Solomons and the advantage of fighting over our own bases disappeared.

Perhaps our fiercest air war so far in the Pacific has been fought at Rabaul, a strongly fortified base with an excellent harbor. The Japs were anxious to keep Rabaul in working order and we were equally anxious to work it over. The result of this conflict is well known by now; Rabaul was put out of commission, but from an aerial standpoint the job was done the hard way. Day after day we sent large strikes of dive bombers, torpedo planes and fighters over the base to neutralize the enemy planes and reduce the shipping in the harbor. For awhile the Japs sent up fighter opposition in great numbers. However, it soon become apparent that what came up had a habit of going down, generally on fire, and the Japs crawled into their holes. During February the enemy at Rabaul confined his air opposition largely to scattered fighters that stunted around on the fringe of our formations.

On the basis of the Japs' increased advantage in fighting

Suicide torpedo attack on a U. S. carrier by this Kate failed when it was shot down an instant after this picture was taken.

conditions and our mounting successes, it would appear that the Japs are getting worse or that we are getting better or that both conditions are true.

One of the more puzzling aspects of Jap pilots' behavior then and now is their predilection for aerobatics. Toward the close of the Rabaul campaign they gave some of the finest exhibitions of aerobatics ever seen in those or any other parts. There are two possible reasons for this foolishness. One is that the Japs hope to lure Allied fighters away from formations when they will be fairly easy prey. Another, and a favorite with American pilots, is that the Japs, realizing they aren't able to fight us on even terms, do the aerobatics in an effort to sooth their ruffled egos.

A great many of our pilots share the conviction that the Japs are crazy. There seems, they say, no other explanation for the puzzling variability of their behavior. "One day they will fly good formations and be tough as hell to get at," a Navy fighter pilot recently said, "and the next day they'll make mistakes that a green kid in training would never pull." He went on to add that over Simpson Harbor he had been chasing a Jap who took wonderfully clever evasive action for quite a while and then just pulled up in front of him and hung there at stalling speed. The Navy pilot, of course, knocked him off with one short burst and returned home, bewildered but happy.

One of the most unproductive Jap tactics involves their staying completely out of range and shooting up all their ammunition. Nobody seems to understand just what the Japs feel that this accomplishes; so far as is known, it has accounted for no American pilots or planes. The tracers loop over in beautiful arcs and fall a hundred yards or so short, and the Japs seldom show any disposition to move closer. When all the ammunition is gone the Japs scoot for home, apparently feeling that they have put in some good licks and are entitled to a rest.

The theory that cowardice may account for this untruculent routine hardly holds water; on some days the Japs will attack with bravado and desperation. It is true, however, that in spite of the much-ballyhooed "suicidal" belligerency of the Japanese, they will seldom stick in a head-on run with an American pilot. In almost every case the Jap pulls out first and often long before he gets within range. During a scouting operation by New Zealand pilots working with the Navy at Munda, one of the New Zealanders, in a fairly ramshackle Grumman *Duck* (J2F) became separated from his squadron mates. In typical New Zealand fashion he decided to have a look around for some Japs to kill. He succeeded in flushing a group of six Jap fighters on his way home and with great glee he sailed out of a cloud and into the middle of them, his .30-caliber guns spitting furiously. The Japs were apparently thrown into complete panic for, after staying just long enough to be convinced that he meant business, they started for home, but one of them didn't make it and two or three others arrived pretty leaky and crippled

It seems likely that the Jap high command, realizing the futility of trying to fight us on even terms at this stage, has embarked on a retrenchment program. Their instructions to

(*Continued on page* 208)

Large numbers of Jap planes can always be caught standing idle on their airfields. These Zeke fighters were knocked out on Tarawa by strafing and bombing Hellcats, Helldivers and Avengers.

SCAT

Marines wounded in the battle for Bougainville are loaded on seven SCAT Skytrains for evacuation from Torokina Point airfield.

SCAT picks up where NATS ends. Its Navy, Marine and Army pilots transport men and materiel to the front, carry wounded to the rear.

BY NOW, everyone knows that NATS, the Naval Air Transport Service, takes the Navy's Pacific freight to the ends of the earth. Hardly anyone knows that an amazing airline called SCAT picks it up there and takes it the rest of the way.

The official designation of this interesting airline is South Pacific Combat Air Transport Command. The initial letter in each word was taken, a few of them dropped, and the word SCAT emerged.

SCAT is a truly military airline. It carries ammunition and gasoline to our most Jap-bedeviled fighter strips. It also delivers that airmail envelope marked "Private Arthur Jones, A.P.O. 9921 % Postmaster, San Francisco."

When the Central Pacific operations began getting under way, the need of a similar service in that area brought forth an organization which at first was called Central Pacific Combat

SCAT still evacuates sick and wounded from Guadalcanal, but most cases now are "sitters"—victims of malaria or small injuries.

Air Transport, or "CENCATS." This designation stuck for a few short weeks and then the outfit became known as TAG, or Transport Air Group. Patterned on the SCAT lines, TAG is just as vital and virile. But all the way down the line it has taken cues from its pioneer predecessor.

In addition to mail and rush cargo, SCAT carries specialized personnel who have to get up and meet the Jap in a hurry. Suppose one of the Navy's mechanical wonders in Washington is needed to flit-gun the bugs out of that last shipment of airplane engines. How does he get there in a hurry?

He gets to Bougainville like this: A NATS or commercial airline plane lifts him across the country to San Francisco. There he boards a huge NATS-leased but Pan American-operated Clipper and 14 to 18 hours later he's at Pearl Harbor. At Pearl Harbor he boards a Navy *Mariner* or *Coronado*. NATS sweeps him on across the blue glare of the South Pacific, beyond Samoa and the Fijis. Finally the flying boat drops out of the sky at a blob of jungle and coral called Espiritu Santo. Espiritu is about 650 miles southeast of Guadalcanal. Here NATS swings south to New Zealand and Australia, and SCAT takes over for such war-infested way stations as Guadalcanal, New Georgia, Kolombangara, Vella Lavella, Bougainville and, some day, Tokio.

A trip across the island in a jeep brings the passenger to an air strip called Bomber Two.

At first glance, Bomber Two looks like any other military transport field—an operations office, a small hut surrounding the desks of the commanding officer, the mail office, a cargo warehouse and a loading ramp. In addition to these familiar objects, there is a tremendous first aid station and rows of waiting ambulances.

SCAT maintains a gigantic flying ambulance service. During the past 18 months SCAT has evacuated more than 24,000 wounded men. During the month of December, 1943, SCAT snatched 3,500 wounded and sick Americans out of the jungle and tucked them between clean sheets in base hospitals. In that same month, with a total complement of about 70 *Skytrains*, SCAT carried 3,383,000 pounds of air cargo, 941,000 pounds of mail, and 22,000 regular passengers.

About 60 SCAT planes are in the South Pacific air every day —every day meaning bad weather, unfriendly intentions of the enemy, and all hell notwithstanding. Really bad hurricanes occasionally delay a SCAT plane. But as soon as the hurricane's tail end passes the hangar the SCAT pilot chases out after it.

This airline was one of the most potent factors in turning back the Jap tide in the early days of Guadalcanal. In the first furious days American surface shipping took a fully expected but terrific lacing from the Jap airmen. Our flow of aviation gasoline gradually became a trickle and then threatened to stop altogether.

If our planes left the sky it meant that we'd have to leave Guadalcanal. For six desperate days the fate of the Pacific depended on *Skytrains* loaded with aviation gasoline. Our harassed Marine and Navy flyers poured that gasoline into the grounded fighters. The *Skytrains* kept the gas tanks full and we held Guadalcanal.

After Guadalcanal, our Navy, Marine and Army heads knew that some such sort of battle airline would be needed again and again as we pursued the Jap up the long path of island flagstones.

Thus, in August of 1942, SCAT was born.

From its inception, SCAT has been a shining example of the new spirit of co-operation among our armed forces. The pilots are drawn equally from Marine and Army flyers; the Navy chips in about a third of the necessary ground personnel and does most of the administrative work. The doctor in charge of the medical end is a Navy lieutenant commander; half of the 50 or so enlisted hospital corpsmen are Navy and half are Army; the 25 nurses are Army; there are seven Navy doctors and seven Army doctors. Everyone concerned seems imbued with the startling idea that inter-service dissension is as old-fashioned as knee-length bathing drawers. SCAT has work to do and does it.

Bringing in the wounded at Espiritu is always a tense time. Each SCAT plane carries 18 litters and as the plane returning from "up forward" nears Espiritu the radio operator calls the operations officer at Bomber Two and tells him how many wounded are aboard. It is not always a full load; it is too often a jammed load. The radio operator may message the field as follows:

"We have 23 wounded, sir. Two compound leg fractures and three head wounds, one of them critical."

(Continued on page 282)

SCAT transport unloads construction machinery to waiting Seabees on Kwajalein. In one month, SCAT moved 3,383,000 pounds of cargo

THE SEABEES

Crushed coral is graded and rolled into a gleaming surface as Seabees ready a new strip in the midst of Majuro's palms.

Landing with the troops, the Navy Construction Battalion builds air strips in the very thick of battle.

ORGANIZED shortly after the beginning of war, the Seabees have done an emergency job with spectacular skill and courage. Often they have had to drop their hammers or shovels every half hour in order to pick up guns and fight the enemy. There certainly was no rest for the Seabees who landed with the invasion force on Los Negros Island. In the daytime they rebuilt the Momote Airfield and constructed other vital military establishments, generally under fire, and at night they joined their friends of the U. S. Army in battle.

Chief function of the Seabees is to provide essential construction quickly in combat areas. Airfields, Quonset, and Dallas Huts, mess halls, offices, and many other similar structures built on islands which our invasion forces have taken are the results of their work. At Bougainville, perhaps the most strategic point in the Solomons campaign, these Navy construction experts did one of their most spectacular jobs. Exactly two days after our first landing at Torokina a Seabee battalion was ordered ashore. By eight o'clock the next morning the battalion had all its equipment unloaded and ashore and was hard at work on an air strip. Hot fighting was still in progress and there were Seabee casualties. Within a few weeks three excellent air strips, roads, dwellings, latrines and headquarters huts were all built, and the Japs at Rabaul were taking a pasting from this new air base. With bulldozers, big tractors, carryalls, and shovels, the Seabees transformed a jungle wasteland into a potent Allied base almost overnight. Just how much this work was appreciated may be judged from the following message sent to Comdr. Henry Clark, head man of the Bougainville Seabees, after completion of the first strip:

"In smashing through swamp, jungle, and Japs to build that air strip your men have proven that there is neither bull nor dozing at Torokina. A Well Done to them all—Admiral Halsey."

By now Seabee activities in each new spot pretty much follow a pattern. The first consideration, once the Marines or the Army has landed and engaged the enemy, is the building of roads, which are of two kinds on the Pacific bases. There are the roads that keep the troops supplied and others which shuttle construction material for the main job at hand—building the air strip. In some places—as at Bougainville, where we were compressed into a small space—one road will do both jobs. The speed with which the Seabees hit this initial project is dazzling. They roll off the landing craft with their heavy equipment and almost without any perceptible slowing of their stride start pushing aside the jungle with bulldozers.

The bulldozer is a piece of equipment worthy of special mention. Perhaps the biggest gun in the Seabee artillery, it has a large metal shield in front and plenty of horsepower behind. With a little momentum it can easily move things like small forests and medium-sized mountains. The mahout to one of these mechanical elephants steers his way right through dense jungle and swamp to start the road. Luckily, in most of the South Pacific islands the trees are shallow-rooted and push over easily.

The bulldozer, it must be admitted, has its limitations; occasionally it is stymied by a rare concentration of flora. The Seabees then rally round with dynamite and give it, and the

Manned by Seabees, these huge bulldozers are gouging out the Eniwetok air strip—stepping stone to other Allied invasions.

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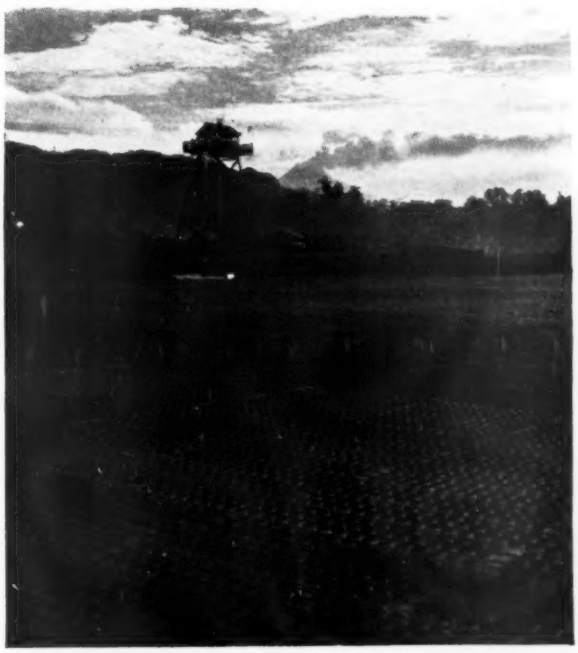
Clearing an area for an air strip usually takes about 10 days. The taxiways, hard stands (where the planes are parked), and revetments (the banks around the hard stands) are built first and then the strip itself is graded, rolled, and covered with a steel mat. Other construction that gets high priority includes the aviation camps, mess halls, offices, power and water systems, and latrines. As a rule, the aviation personnel get the first huts, and after them the officers and men who operate the fields and do the administrative work. The Seabees build Quonset and Dallas huts grudgingly; living in tents themselves, they feel that everybody ought to be tough enough to live in similar rusticity. In putting up wooden living quarters the Seabees use native lumbers almost exclusively.

In addition to all this, the Seabees do a lot of miscellaneous work. For 45 days after the air strips and camps were completed at Bougainville they were busy salvaging landing boats that had been sunk or damaged in the attack. Altogether, they salvaged 65 LCM's and LCT's.

Much of this work must be done under combat conditions. For long weeks after many of our invasions the Japs have come back with hard counter attacks. In other cases the initial ground fighting continues for months. The Seabees often have to join the regular troops in fighting off the enemy. On one

(*Continued on page 258*)



Piva's "waffle-iron" strip has a volcanic plume for backdrop.

THE SEABEES

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(*Continued on page* 258)

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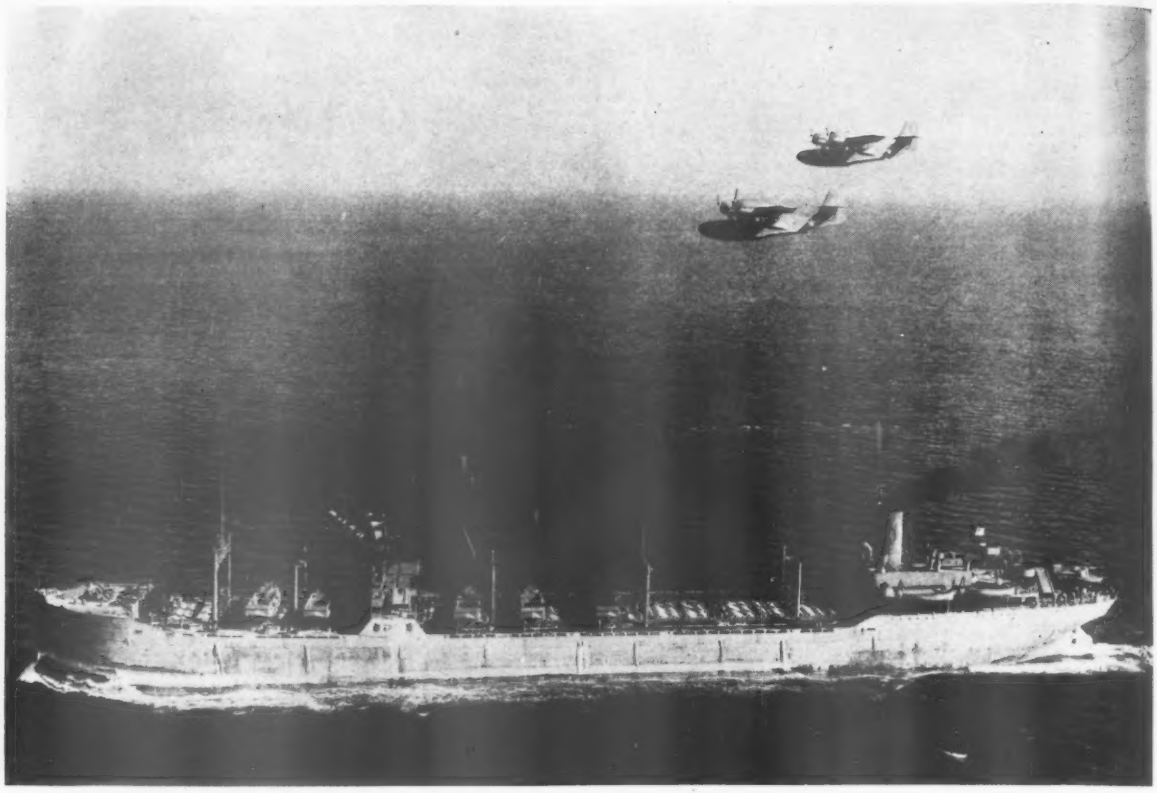
The COAST GUARD



Widgeons of the Coast Guard on sea-lane patrol check the identity of a merchant ship in their search for blockade runners.

Under Navy command, Coast Guard pilots do rescue service, patrol harbor approaches, and escort coastal and transocean convoys.

IN THE operations room at a Coast Guard air station at Floyd Bennett Field, New York, a telephone rang excitedly. Picking up the receiver, a Coast Guardsman heard a grim message and an urgent request: A Navy destroyer, U.S.S. *Turner*, had sunk off Sandy Hook following several terrific explosions which shook the area for miles around. Some of the wounded seamen landed ashore were urgently in need of blood plasma. Could the Coast Guard pick up a shipment and rush it through?

Rushing it through meant flying through snow and sleet that had grounded every plane in the area. But it happened that the Coast Guard air station had a number of helicopters which might be able to make it.

Within a few moments Comdr. Frank A. Erickson, commanding officer of the Coast Guard air unit, took off in one of the helicopters and flew to the Coast Guard barge office at Battery Park in lower Manhattan. He picked up two of eight cases of blood plasma which had been relayed there by the Red Cross and took off again for the scene of the disaster. At the same time the rest of the shipment was hurriedly dispatched by a Coast Guard cutter.

Fourteen minutes later the rescue workers attending the wounded at Sandy Hook saw the helicopter pancake down to an easy landing on the beach, and the life-saving plasma was soon being administered to the most seriously injured men. The plane had covered in 14 minutes a distance which took an hour by boat and required an hour and one-half by car. It was the first time that a helicopter had been used in such an emergency—another first for the United States Coast Guard.

Only when some dramatic incident comes to light does the American public learn of the fine job that Coast Guard aviation is doing in this war. Unknown to many and sometimes not fully appreciated are its routine tasks. The Coast Guard patrols the harbors and channel approaches, scans the sea lanes for enemy submarines or surface craft and survivors of stricken ships, and escorts coastal and transoceanic convoys.

On a patrol over the Atlantic a Coast Guard pilot must maintain a constant vigil for hour after hour, with nothing to relieve the monotony except an occasional radio contact with his station. Every whitecap in the churning sea is the same—except that one which may hide the periscope of a U-boat. Or wallowing helplessly off in the distance, now visible, now hidden, may be a group of torpedoed ship survivors whose lives depend upon a fleeting glimpse from the pilot. By just such diligence, Coast Guard pilots in a typical six-month period rescued more than 500 survivors of enemy torpedoings.

The Coast Guard has made wide use of the "grid" system of search and the Navy credits Coast Guard pilots with being experts in this operation. Under the "grid" system, the plane begins at the nearest probable point of contact and flies back and forth constantly in an ever-expanding pattern until the object is discovered or it is determined that it is no longer in that area. Usually a plane whose known object is a party of survivors carries a pharmacist's mate, for sometimes

(*Continued on page 274*)

On eve of February 19 strike on Rabaul, Maj. Max Volksnisk, USMC, Fighter Staff ComAirSol, explains the morrow's mission.

AIR COMBAT INTELLIGENCE

Intelligence probes enemy weak spots, makes the plans for combat missions.

IF YOU are a combat flyer taking a dive bomber off the deck of an *Essex*-class carrier for an attack on a Japanese base, there are a lot of things you want to know about that base. You will want to know:

What it looks like from the air.

What its antiaircraft defenses are believed to be.

What kind of aerial opposition the Japs are likely to offer the attacking group.

Just which targets are the ones to be hit and the order of their priority.

What chance you have of being picked up if you make a water landing somewhere near the target, and what is the best area for such a landing.

Where the carrier is to be when you return.

What the communications plan involves for you.

If you are land-based—in the Solomons, Alaska or the Central Pacific—cleaning up the Japanese positions which our "island hopping" has left behind, or softening up Japanese bases which are to be attacked, you'll want the same information. You will be anxious to have it no matter what sort of plane you fly.

Flyers and operations officers haven't the time to assemble the kind of material and information required. They haven't time to digest the monographs, reports, summaries and large amount of available information on a given area or a particular target. Neither are they trained for this work. The Navy, however, has Air Combat Intelligence Officers, hand-picked and carefully trained for the job. Many of these officers now have had two years' active duty in the fleet or on shore bases in combat areas. They are experienced in the work of giving information to the crews who man the planes so that, when an attack is made, the men who make it know the important facts about the target to be hit and the enemy to be met.

Air Combat Intelligence has had a relatively brief but effective career. In mid-April of 1942 the first class of Air Combat Intelligence Officers, 53 strong, started on a two-month course of training for their work. Virtually all Naval officers in the class had previously attended the indoctrination school at Quonset Point, R. I. They had been selected on the basis of qualification for ACI work. Since the first class was graduated from the school, which is also at Quonset Point, on June 16, 1942, approximately 1,100 reserve officers have been trained for ACI work and have been sent out to the Fleet, to shore bases and to special assignments in the United States and overseas. Generally they have been men in their middle 30's, with a background of experience in business, law, journalism, advertising or some special vocation. Many of the older men were well known in their chosen fields before they volunteered for active duty in the Navy.

After returning from Rabaul strike, pilots are questioned by Air Intelligence Officer George Sheaffer in squadron's ready room.

At the outset, Air Combat Intelligence was under the Bureau of Aeronautics, but changes in the Navy Department, brought about in the past two years, have caused a shift. In January, 1944, the ACI group became one of the four major subdivisions of Naval Intelligence, with an organization in Washington. This group originates material and sends it out to the Fleet. In addition, it receives information from innumerable sources, reviews it and feeds out vital data to flyers in training in the United States through ACI officers assigned to training commands. It also goes to key Navy Department officers as well as to commands overseas. Speed is essential if the flyer who is going into combat has the latest information on targets, enemy tactics and the like. So this and sub-centers which feed out spot information to the ACI officers on carriers and at far-off bases have been established.

Training now involves 10 weeks of intensified study. The courses include, among others, intelligence procedure, plane and ship recognition, sources of intelligence material, navigation, fundamentals of air tactics, aerology and geography. Graduates of the Yale Law School and Ph.D's have been known to flinch before the exactitude required to attain a high mark in this work. But when a man graduates from the school he is well fitted for a job as an Air Combat Intelligence Officer for the U. S. Navy.

Because of the need for ACI officers in the early days, men fresh from school normally were assigned direct to squadrons, carriers or staffs in a combat area. Numerous experienced men are now available; so graduates of the school now go to overseas centers, where they get practical experience and further background for the work in a specific area before actually joining a unit. Thus, they are familiar with the geography of the area in which their unit is operating when they join it. They can pinpoint Nadzab, Thousand Ships Bay, Nukefetau or Amchitka blindfolded. They know where to go to get the best charts of Davao or Matsuwa. They have information on approach procedures or know where it can be obtained, and they've studied photographs of the targets. They know, too, what kind of information the commands want on the performance of our planes and the Japanese planes; on damage done by various kinds of bombs; on methods of sighting used to fire rockets; and they can prepare reports covering such information after fights. If they are to be on a carrier, they have had experience on keeping a ship's plot and on preparing a daily summary from dispatches. They are versed in enemy tactics and have the latest information on plane types, warships, and the disposition of the enemy's forces.

ACI officers have served not only with the Navy ashore and afloat, in combat and in rear areas, but with the Army, the Marines, and with Allied units in Europe, Africa, China, India, and the Pacific. In doing so they have not only fed information to such outfits but have reported back to ACI centers on tactics used by the other groups. Interchange of knowledge with other commands has helped greatly in the development of Naval air tactics.

The ACI officer's prime job in a combat theater is to help in briefing flyers for a combat mission and to interrogate them after the engagement. For the briefing, he must have last-minute dope on the target to be hit. He must pore over photographs and talk with photo-interpreters to determine the location of antiaircraft positions, prominent buildings, and plane revetments. He must know, and tell the pilots (if his outfit is fighting an island campaign) where the enemy is and where friends may be found if the pilot is shot down or his engine cuts out on the way home. He must also give the word on the types of planes the enemy is likely to fly against him and what their most vulnerable spots are. He must present all this information to the pilots quickly and intelligently, not confusing them with unnecessary detail yet being certain they have all information essential to doing the job and doing it up really right.

For explaining attacks on a specific target, the ACI officer uses models and photographs, plus outline blowups, to illustrate his remarks. Even on carriers an expert model maker works with the ACI officer, preparing a scale target model. The most recent photographs are enlarged and then further blown up with the use of baloptican, so that the pilots can see the target they are to hit. Charts are supplied for the specific sortie.

When the flyers return from a strike it is the ACI officer's job to get all the information possible from them. The pilots are required to plot on an outline map exactly the position where their bombs fell, if an airfield was attacked. Was that ammunition dump hit? Did you get those oil tanks? What color was the smoke? How high were the flames? These are typical questions of the ACI interrogator.

If the pilot says, "I got two *Zekes*" the intelligence officer will want to know several other things. "Did they burn? Did they go into the water? Were they seen to crash on land? Were they *Zekes* or *Tonys*—or possibly some new model?" He gets out all his plane identification material and goes over it with the pilot.

If pictures were taken, the ACI man works with the photo-interpreter to check the damage claims. Then he prepares a report of the action, the information from which goes to form part of the available lore on enemy planes and installations and the performance of our planes in combat. The information from his squadron's report will help similar squadrons to fight better and help new pilots to be better trained.

(*Continued on page* 318)

Later, ACI checkup establishes inter-relation of flyer's reports, ties carefully sifted individual reports into meaningful whole.

AEROLOGY

Weather is used as a weapon in this war to shroud attacks and hide plane and ship movements.

IN THE early dawn, the sea was glassy calm as the *Catalina's* engines warmed up at the base on Adak Island for a patrol mission. After a smooth run the big Navy plane lifted and swung to the southwest. Inside, the crew members, veterans of rugged Aleutian weather, were impressed by the beauty of the sunrise. The sky gave every promise of an unusually good day.

"Better put the coffee on and cook it fast or we won't have time to drink it," warned one of the passengers. "We'll get a snootful of weather before this day is over."

The speaker was Lieut. Comdr. (now Comdr.) John Tatom, USN, of Richmond, Calif., aerological officer of Fleet Air Wing Four. His ominous prediction sounded a little ridiculous—with the sun rising over a clear horizon. There were a few jokes about the weatherman forecasting with a crystal ball and always being wrong. But his words jolted the crew back to the chief purpose of the mission. Observing enemy activity was of secondary importance on this trip.

Weather instruments at the base had indicated that a severe storm was shaping up somewhere in the vast Aleutian weather pot. Little more was known. Ships at sea were observing strict radio silence, and there were few reporting weather stations. The *Catalina* was on weather reconnaissance, to track down the storm, strip it of surprise, and enable the United States Navy to use the condition as a weapon against the enemy.

The coffee had not begun to brew before a high overcast spread across the sky ahead. The deep purple, grey, and black were in sharp contrast to the bright colors to the north and east. The storm was making up much sooner than expected. In fact, swift action was necessary to pin it down, get all information possible about its speed and movement, and relay the word back to base. Operations for many days, involving ships, planes, and men, depended on what this weather front was doing.

The idea was not to dodge the storm—but to find out all about it. Heading directly into the darkest area, where white caps were now boiling and black clouds were rolling around, the pilot nosed close to the surface to get proper wind values for navigation.

A fine drizzle suddenly changed to a mixture of rain, snow, and sleet. The navigator was on a merry-go-round, from drift sight to plotting board to pilot, with the latest drift correction to the course. As they approached the turbulence the drift jumped from zero to 10° to 15°, to 20°, and now to 25°.

"How much wind?" someone asked.

"About 50 knots," the navigator replied.

Each time an increase in drift was reported the preciptation became heavier, the air colder, and the plane more skittish. Safety belts were fastened as it bucked and pitched, and ice from the propellers drummed against the hull. Along the boots a white line spread as icing grew heavier. Occasionally the monotonous roar of the motors was interrupted as the pilot worked the throttles to keep the intake valves from freezing in one position.

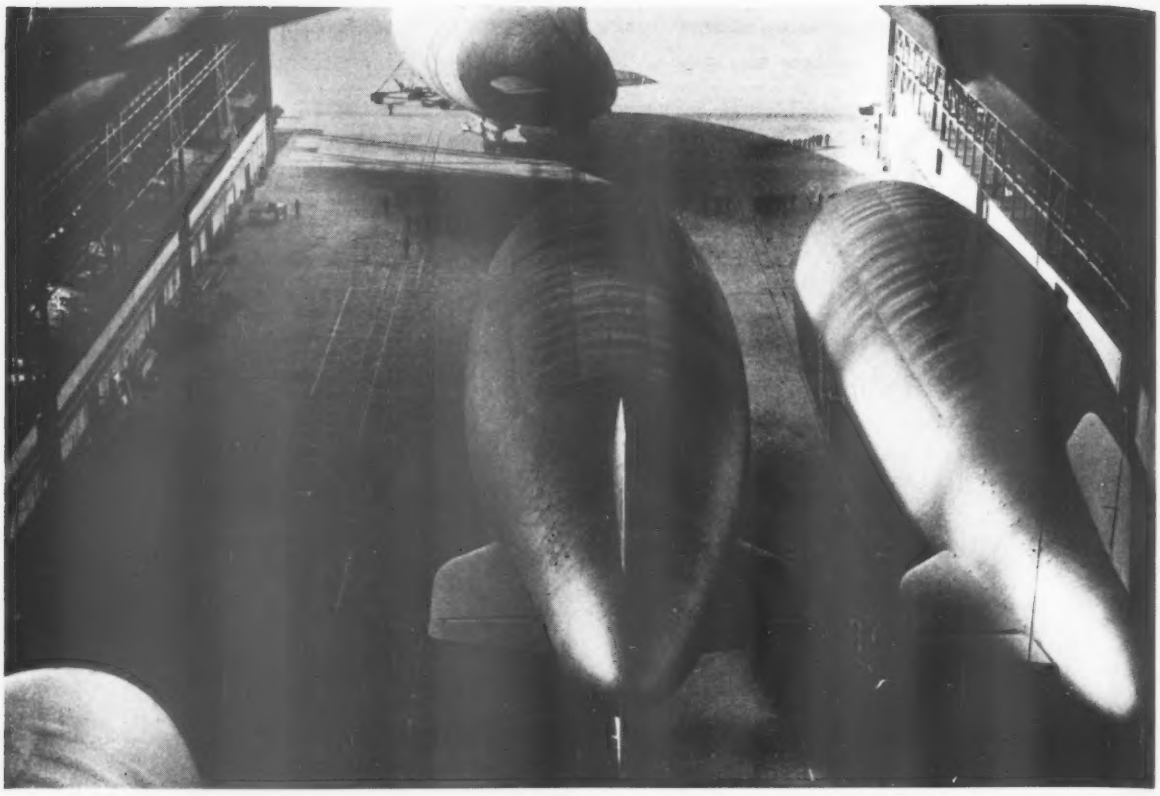
"Thirty degrees right drift," announced the navigator.

Reports were now coming in to Commander Tatom from

(*Continued on page* 194)

Theodolite checks balloon course and cloud height in Aleutians.

RAF meteorologist discusses Biscay weather with Navy navigator.



Semi-rigids, for coastal patrol and training, are shown in their hangar at the Navy's Lakehurst, N. J., air station.

LIGHTER-THAN-AIR

Little-publicized but widely respected, the boys who fly the 'rubber cows' have turned in an enviable record in this war.

LIEUT. (jg) Wallace A. Wydeen, a lighter-than-air pilot, was flying one of the Navy's big K-type blimps over the Caribbean Sea on a routine anti-submarine patrol. It was a fine quiet day, about noontime. There was nothing to indicate that within less than an hour he would be acting as traffic cop in one of the most prolonged aircraft-submarine battles of this or any other war.

The lookout in the forward gondola reported a disturbance far below on the water's surface. Closer scrutiny revealed that it was an altercation between a Navy patrol plane—a *Mariner*—and a Nazi submarine. An exchange of radio communications between Wydeen and Lieut. Lewis D. Crockett, pilot of the *Mariner*, brought out some additional information.

The Nazi was wounded so badly he could not submerge, and was battling viciously on the surface. Already one *Mariner* had been shot down by the sub.

Lieutenant Crockett had expended his bomb load and was spraying the deck of the sub with his machine guns to keep things warm while awaiting reinforcement from airfields on the mainland, a couple of hundred miles away.

"The krauts are ready with that AA"; warned Lieutenant Crockett on the radio, "keep that blimp out of range." Crockett was commanding as well as fighting the battle. "Another bomber—*Ventura*—is on the way. He ought to be here soon. if he can find me," he reported the blimp's radioman.

"He can find you," said Lieutenant Wydeen. "He can find me sitting up here and I'll direct him to you."

And that is exactly what the blimp's skipper did. Hovering near the scene of battle, high enough and big enough to be seen by any aircraft that came within miles, he directed them all to the scene of the scrap. In all, six Navy planes, one Army bomber, and a destroyer, were guided to the fight before the submarine rolled over and gave up the ghost—and sixteen prisoners.

The battle had lasted ten hours. Before arriving on the scene the blimp had been on the last leg of a long patrol. Lieutenant Wydeen exceeded his prudent limit of radius of action, and ran out of gas on the way back to base. Consequently, his blimp was lost, although the crew was saved.

Directing air traffic in battle and serving as a marker for planes to home on, are just incidental to the jobs the big blimps do in this fast-moving war.

"Our most spectacular task," says Capt. Charles J. McGuire, who heads the planning division of this branch of Naval aviation, "is rescue work at sea and in the jungle where no other type of flying craft can function. But we still do our most effective jobs on submarine search and convoy patrols."

(*Continued on page* 240)

THE FLIGHT SURGEON

Flight surgeons now train and live with their squadrons, try to keep the most men possible in best flying condition.

Lieut. William Snagg, flight surgeon for a squadron based on Bougainville, checks physical condition of one of his pilots.

BEHIND the exploits of some of our greatest Naval airmen is that little-mentioned figure, the flight surgeon. His deeds are seldom recounted because he has been too busy solving new medical problems to take time out to tell his story. "Flight Surgeon" does not signify a doctor who practices surgery in airplanes. Military custom and tradition calls the medical officer a "surgeon." Consequently, "flight surgeon" means a doctor who practices aviation medicine.

His duties are so varied that once during an alumni gathering of doctors in which one after another stated his specialty—such as the heart, the eye, the brain, and so on—the flight surgeon present could only describe his medical practice thus: "I am a specialist of the skin and its contents." But although he touches many branches of medicine, his objective is easily stated: *to keep the greatest possible number of pilots in the air at their maximum efficiency.*

It isn't easy. Technicians have developed the airplane to a point where mechanical failure is rare, but man is still bound by human frailties. During the last war, engine failure was common. In this one it is the pilot who cracks up. Man has been outbuilt. For example, two planes approaching each other at speeds over 300 m.p.h. surpass the pilots' vision-recognition speed. It is therefore incumbent upon the scientists, engineers and researchers to adapt man to keep pace with the plane. The flight surgeon puts his findings to practical use and employs his own ingenuity to solve other problems of aviation medicine as they arise.

From the start, it was recognized that each squadron should have its own flight surgeon, who would live with the flyers and learn their individual characteristics in order to treat them intelligently. In the early days the surgeon was assigned to a squadron in hit-or-miss fashion. Now, however, he trains with them from the first and sticks with the squadron afloat or ashore.

The carrier-based flight doctor is different from a ship's surgeon because of this narrowed responsibility. But he does have the ship's medical equipment at his disposal and other medical men to consult. A large carrier may boast more doctors and better operating rooms than the average progressive township in the United States. There is little of the rough and rugged improvisation of the Captain Hornblower days, when the patient took a rum anesthetic before an amputation. Things have improved since that time and since the days when the poet Keats was a ship's surgeon. But if the surgeon goes ashore, as he well may, his abilities, like those of the flyers he has charge of, will be taxed to the utmost.

Many accounts from the South Pacific describe the job. Lieut. Comdr. Marion M. Kalez, (MC), USNR, wrote:

Snagg Sanitarium, named for flight surgeon, is also called "The Flying Bedpan." Scrutiny reveals that utensil painted on gable.

Cases difficult to move are cared for in this Naval advanced base hospital in Bougainville, made as bombproof as possible.

"Feet of mud, inches of rain, tropical heat, damp jungle thickets, hosts of insects, flies, mosquitoes, and the dysentery and malaria and tropical fevers they carry; inadequate shelter and limited food, let alone the results of the war, its wounded and dead. Bombings and shelling, foxholes and crashes, all mark it as ugly. Destruction, waste and carnage within full view. Sweat and stench of human rot. . . ."

Another flight surgeon, Lieut. William Tomlin Snagg, (MC), USNR, was interested in flying before the war. He had had 250 to 300 hours in his own plane. After going through the Navy's aviation school of medicine at Pensacola, he drew a shore duty, disliked it and finally landed a dive bombing squadron at Pearl Harbor. After a few weeks on other islands of the South Pacific, it came to rest on Munda. The squadron's first combat mission came the morning after it arrived. The members were physically worn out. They had tents with mud decks, no nets. Before midnight Snagg had rounded up blankets and mosquito nets but he could find no mattresses. Unburied Jap bodies lying in the nearby bushes were an added irritation. That night there were two air raids. The foxholes were full of mud and land crabs and centipedes.

The first bombing missions were against the then Jap-held Bougainville. When a beachhead on Bougainville was taken, the squadron moved there and then began the monotonously regular bombings of Rabaul. Between Munda and Bougainville, the squadron lived on various islands, moving with the slow advance up the Solomons. The first death in combat affected the boys profoundly. Snagg let them talk about it for a while before declaring the subject taboo.

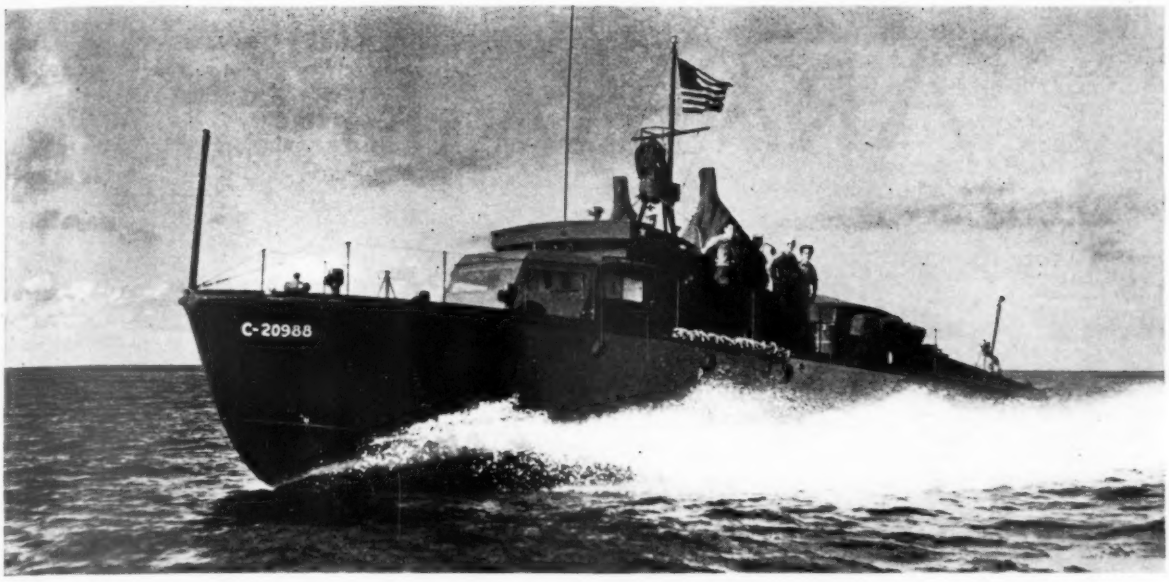
It was while they were stationed at Vella Lavella, and striking Buka 200 miles to the northwest, that Lieut. (jg) Robert Burns was injured. Burns didn't look much like a fighter. He was thin, asthenic and had a sparse, scraggly beard. But when two fragments of a 40-mm. Jap shell went through his leg, two more went through his arm and another penetrated his chest, he still managed to fly 200 miles back to base in formation. All his instruments were gone, his face was burned and his eyes were almost blinded from hot oil. His rear seat gunner was unaware that he had been hurt, the plane was flying so well. Knowing that he had no landing gear, Burns circled his home field and signaled for an emergency landing, getting the green light. He was worried that a belly landing would tear up the mesh strip the Seabees had built, so he landed in a taxiway and stopped just eight feet short of the water. He was so weak from loss of blood he couldn't get out of the plane. Dr. Snagg dressed his wounds in the plane and got him out to the base hospital, where the boy said he wanted his own flight surgeon to do all the work on him. Lieut. Burns later got over his wounds, returned to his flying, and Dr. Snagg went on record as saying that the flight surgeon had the best job in the Navy.

Captain C. G. DeFoney, (MC), USN, tells what flight surgeons had to deal with when aviators first went ashore in the South Pacific. "At that time," he wrote, "our forces were not so long on planes, pilots, or food. This was, of course, due to transportation difficulties as well as to the fact that the Japs were holed-in not too far away on the same island. Their ships and planes were based within easy striking distance and made the problem of landing equipment and supplies rather a tough one. Our pilots were forced by circumstances to fly many more hours daily than the average aviator could take under peacetime conditions. They flew day and night and ran into stiff opposition from the Japs on most flights. Coming back to their home field, they would go to their tents and hope for a respite from their labors.

"About that time, someone would begin to beat on the old shell casing which hung outside the operations shack, and the word would go around that an air raid was in the offing. The exodus from the tents then began. Some would appear in skivies, a very few of the more fastidious in pajamas, and the run of the mine in the usual khaki shirt and trousers, to head for their favorite foxholes. The speed attained in the proceeding was influenced greatly by the proximity of the Jap, who could be heard long before he laid his eggs. This might happen as often as four times in a bright moonlight night. There would be much gabbing, joking, and even skylarking, (when there was room) in the foxholes while waiting for the bombs to drop.

"The flight surgeon would, during these waits, have an excellent opportunity to spot the jittery individuals or the changes

(*Continued on page* 306)



Navy's Aircraft Rescue Boats contain small "hospital" for injured, cockpit, bridge, pilot house, radio shack, bunk room and galley.

CRASH BOATS

The rough-riding 37-knot Navy crash boats rescue crews downed on the ocean and salvage materiel before water ruins it.

ARB is Navy nomenclature for trouble.

The three letters designate a little-known adjunct to Naval aviation—Aircraft Rescue Boats.

Nearly every place that Navy planes are flying, the ARB's are standing by waiting for trouble. Their job is to save planes and flyers.

Attached to advance bases, the crash boats are on the job 24 hours a day. They've recovered planes and crewmen, and saved the crews of torpedoed tankers in their rough ocean missions.

Lieut. (jg) Thomas W. Greene of North Carolina is a "typical" crash boat man. Greene is the senior officer and head man of the five crash boats berthed at Espiritu Santo, our big advance base in the New Hebrides. When the war broke out he left his job as foreman in a five-and-ten-cent store to go to the South Pacific by way of midshipman's school at Chicago and a bit of preliminary skirmishing with sub-chasers in Florida.

Lieutenant Greene and his boat, manned by a gunner, a quartermaster, a radioman, a bosun and two engineers, are away from the dock in roughly two minutes flat when an emergency flash comes in. Suppose a *Corsair* is down in 30 feet of water up the beach toward Malo, 20 miles away. It's a rush job. The plane has been down about eight hours. If a salvage crew can get it up within four more hours the *Corsair* can be used again. Seawater ruins a plane in about 12 hours.

Before leaving Espiritu Santo, Greene and his crew pause long enough to take aboard two divers fitted with makeshift equipment that consists of little more than gas masks rigged for underwater use. The sea is rough and the divers, unused to small craft, lose a little color as the crash boat skips over the choppy sea at 25 knots.

(*Continued on page* 296)

Officer and seven enlisted men who comprise crew of Aircraft Rescue Boat are photographed in bow of their fast 63-footer.

ARMAMENT

Bombs ready to be wheeled out to Douglas Dauntlesses parked on edge of Majuro bomber strip in the Marshall Islands.

Bigger guns, bombs, and torpedoes, on planes with ever-increasing speed and range, have won Navy air supremacy.

IN THE course of its early combat experiments with aerial rockets, the Navy selected a squadron of rocket-equipped *Avenger* torpedo planes to have a fling against a Jap-held island base in the Pacific. Ordnance and intelligence officers curiously waited aboard a carrier for the reaction to this new weapon by pilots trained in the conventional skills of torpedo drops. An excited verdict was returned by the first pilot back aboard.

"Take away those torpedoes and hang me with rockets," he shouted. "They're the greatest invention since the nickel cigar!"

It later developed that this pilot, freed of the exacting pattern of torpedo bombing, had used his plane as a fighter against a Jap lighthouse suspected of being a guard station. Zooming his heavy bomber over the target in a succession of passes, he took rocket potshots which riddled the bull's-eye with satisfactory explosions of stone, cement, dust and Japs.

Never before in a war have pilots experienced more frequent and radical advances in armament. Aviation armament is the offensive and defensive equipment in an airplane. Aerial rockets, or rocket guns, have been only one of the new combat weapons of this war; they have been developed for practical use after many experiments of scientists. They have added materially to aerial firepower and may well emerge from the war as one of the great new weapons of our time.

As in other wars, the Navy has evolved and put to practical use many new weapons. The Civil War brought forth the rifled cannon and armor plate, both of which were Naval weapons. One of the most spectacular devices of this war has been the Norden horizontal bombsight—developed by the Navy over a period of years and subsequently turned over for Army specialization because of the Army's great need of it. Other developments in armament, some of them still on the drawing boards, may not be generally known for years because of security reasons.

Aerial armament emerged toward the last of World War I. Airplanes were classed with observation balloons. Then one day a pilot fired his service pistol. Later he took to carrying a shotgun or rifle. Soon he was figuring means of equipping himself with a machine gun and was dropping small bombs over the side by hand. Airplanes became offensive weapons, basically nothing more than aerial platforms upon which to mount offensive armament. Students of aviation are fond of recalling that, barring the rocket gun, combat flying has brought about no basic change in armament since 1918. That may be true in the theoretical sense, since before the Armistice of 1918 planes were carrying sizeable cannon. Many refinements in these weapons and their tactical use have evolved, however. There is no more comparison between armament of 1918 and 1944 than there is, say, between Dewey's flagship and the *New Jersey*.

With a belt of .50's draped around his neck, a Marine crewman prepares to load the wing guns of his heavily-armed Corsair.

Guns, bombs, and torpedoes are the main items of the U. S Navy's aerial armament. The basic guns of warplanes are the .30- and .50-caliber machine guns and the 20-mm. cannon. Bombs range in weight from a few pounds to well over a ton —and Navy planes also launch the one-ton aerial torpedo. An enumeration of recent armament developments that have made the Navy's air arm so formidable should include:

1. Heavier caliber machine guns (mostly .50's) mounted in greater numbers throughout the plane.
2. Rocket projectiles.
3. Heavier, rapid-fire cannon which have proved effective against small ships, tanks, and beach defenses.
4. Power-driven gun-turrets.
5. Development of remotely-controlled and power-driven machine gun mounts.
6. Improvement of gunsights on fighter planes to assure more accurate firepower.
7. Improvement in armor plate and bullet-resisting glass.

Even more effective devices are now planned or are in use on the war fronts. They indicate the trend toward heavier and heavier armament, mounted on speedier planes with an ever-increasing range.

Early evidence of this trend was shown in a change of Navy policy at the outbreak of the war which permitted the use of land-based planes. Although the amphibian version of the *Catalina* was Navy equipment and did stellar service in the Battle of Midway, it carried only one quarter of the armament of the *Liberators* which went into use in October, 1942.

One of the war's best weapons, the .50-caliber machine gun, is utilized in both fixed and flexible mountings. An exclusive American aircraft development, the .50 is a heavier installation than the .30 (about three times its weight, or 62 pounds). And, although it can fire only about 800 rounds per minute as against the .30's 1,200, it's maximum range on the ground is 7,200 yards, or over four miles, while the .30's is only 3,400 yards. A round of .30-caliber ammunition weighs 396 grains, or about 0.9 of an ounce. A round for the .50 weighs 1,800 grains, or slightly over a quarter of a pound, and pierces ¾ in. of armor plate.

This difference in range, plus heavier armor plate, more than made up for the differences in speed and maneuverability between Navy *Wildcats* and Jap *Zeros* in the early stages of the Pacific war. It may be assumed that the *Hellcat* and the *Corsair*, Navy fighter planes that are superior to the original *Wildcat* in speed, maneuverability and range, also carry heavier armament.

Heavier armament, increased speed and changes in maneuvering characteristics of aircraft created the necessity of new tactics. One of these tactical developments was the so-called "Thach Weave," a fighter tactic evolved by Comdr. John S. Thach, USN, after the Battle of Midway. It multiplied the number of fighter planes which can bring their fire to bear on the enemy. This team method is now standard in the Navy. Masthead-bombing and anti-submarine tactics are other tactical developments. Even pre-dating this war is the Navy's widely copied (by the enemy) dive bombing methods and coordinated dive-horizontal-and-torpedo bombing attacks.

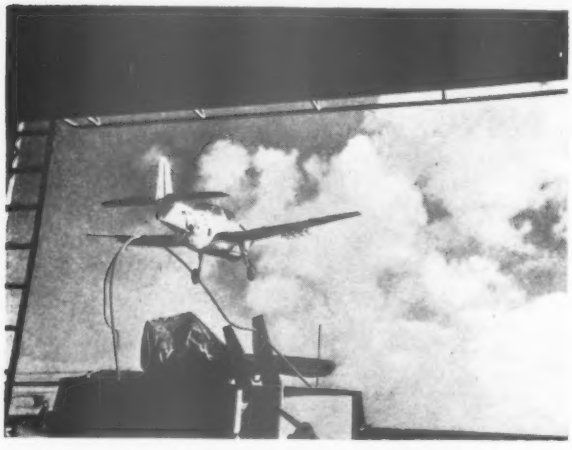
There is probably no better example of the seesaw change in armament, tactics and relative firepower of opposing forces than in the anti-submarine warfare of this war. Up to June, 1943, when a patrol plane sighted an enemy submarine the standard procedure was to attack immediately before the sub could escape by diving. But there came the time when a Navy *Catalina* patrolling the approaches to Trondheim sped in to kill a sub it spotted on the surface, only to meet antiaircraft fire which subs had rarely used before. During this new phase of the submarine war, out of 17 subs sighted, 16 remained on the surface to battle the attacking planes. So, once again, the race for heavier armament was on.

The big guns of the Navy's aerial warfare are its dive and torpedo bombers. The oustanding dive bomber today is the Navy's SB2C, the Curtiss *Helldiver*, successor to the Douglas *Dauntless* which has gone out of production after a valiant record of combat. The *Helldiver*, a heavy two-place bomber, carries a greater weight of bombs, has greater range and, most

Gunner manipulates the .50-caliber machine gun in side blister of a Catalina, one of the four types of Navy patrol bombers.

Arming plane for a submarine hunt, Navy personnel load depth charges into bomb bay of a Navy Liberator at an English base.

Loading incendiary clusters into Avenger for Kwajalein strike. Other bombs are fragmentation, anti-personnel, armor-piercing.



Avenger takes off from carrier on rocket attack. Fired from underside of wings, rockets are most effective in close work.

important, is one of the fastest big planes in the air. The *Helldiver* is at least 100 m.p.h. faster than the German Ju-87 *Stuka;* it mounts four fixed machine guns in the wing and has twin flexible machine guns in the rear. The *Avenger* (Grumman TBF; General Motors TBM) is the Navy's standard torpedo bomber and one of the great performers of Pacific fighting. The *Avenger* carries a one-ton torpedo, has twin rear-seat turret machine guns, a ventral or stinger gun aft and can carry either a torpedo or an equivalent load of bombs or aerial mines. The *Hellcat,* the big new fighter, is also capable of carrying wing bombs and has been used for bombing purposes.

The Navy's patrol bombers—the *Ventura, Catalina, Coronado,* and the *Liberator*—all carry a great weight of bombs and gunnery armament.

For many purposes Navy planes are armed and will be further armed with cannon, and there have been some 20-mm. installations. There has also been some Navy experimentation with 37-mm. cannon installations which hurl a projectile weighing a little more than a pound. It is felt by some pilots, however, that such heavy guns lack the flexibility of the .50-caliber machine gun and that the number of rounds a plane can carry is greatly limited.

Firepower is still the greatest protection for both planes and flyers. Much of this protection derives from advances that have been made in gunsights and in training methods. The ordinary ring and bead sight of World War I has given way to reflector and other types. A reticle image projected by the new sights on a transparent reflector plate moves, at infinity, with the gunner's eye. Thus, regardless of roughness of flight or the movement of the gunner's head, sight lines and target remain together.

Development of three types of ammunition has also increased the effectiveness of our firepower. Armor-piercing, incendiary and tracer shells are used in various combinations while specialized bombs have added to the effects of Navy bombing strikes. In general, bombs are incendiary, fragmentation, anti-personnel, general purpose and armor piercing. They range in weight from two pounds to over one ton.

Most recent firepower development, so far as America is concerned, is the rocket gun. It was developed by the Russians and used for some time by the British and Germans, but only recently the Navy disclosed that the United States is more than keeping pace with this sort of armament production. Early this year American airmen were given the chance to test rocket projectiles against the once-deadly U-boat. Detailed results of the strike have not been disclosed but it is no secret that a new balance was established in the struggle for armament superiority that developed since the U-boats added antiaircraft guns to their equipment. Navy-developed rockets are fired from fittings under the wing. They may be fired in pairs or in a salvo.

As the fighting progresses, many new items of armament will appear and designers will be kept busy building new wings and engines around heavier guns. It is a race of armor versus firepower, gun against gun. The Navy has never been left behind in this kind of race. For that reason the outcome of the armament competition has never been in doubt. When Tokyo is finally invaded the chances are good that Hirohito will look down the muzzle of the biggest gun he has ever seen. END

ADVANCE BASE

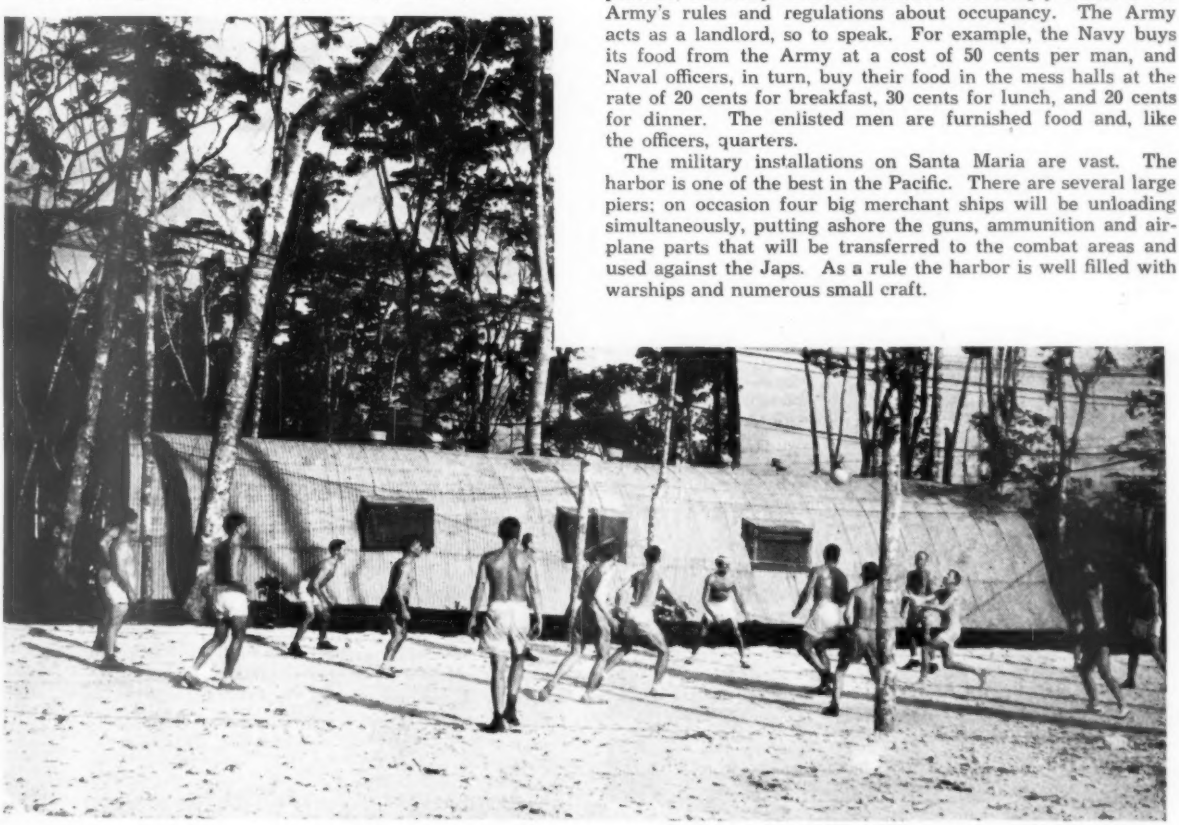
Life on an island outpost isn't easy. Here's how it's lived at Santa Maria—fictional name for an important base.

Itinerary guidepost, this Majuro sign indicates course of servicemen's thoughts—road to victory is the quickest way home.

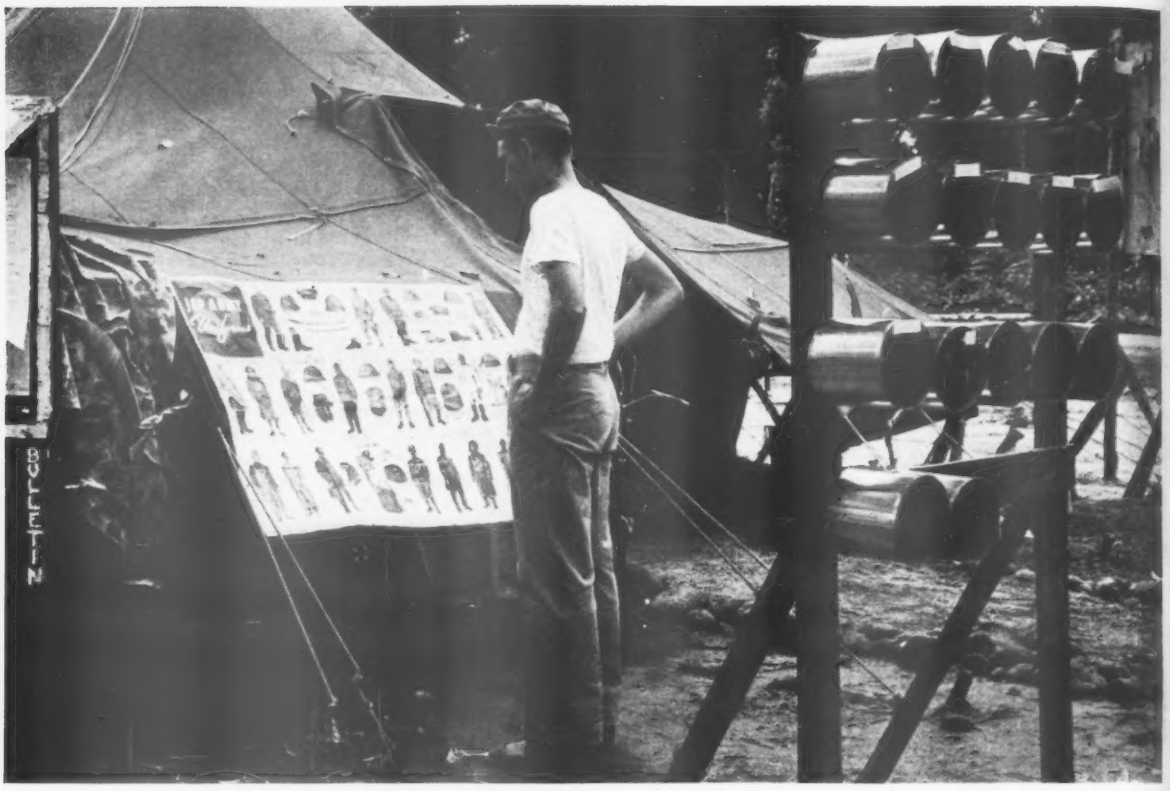
SANTA MARIA is a large Naval advance base in the South Pacific. It is more than 100 miles around, it is circled by a beautiful coral road and, except for the jungled, mountainous interior now occupied by native Melanesians, it is crammed with military installations. In spite of its size and importance, Santa Maria is impossible to locate on the most elaborate map, for the name, in the interest of security, is fictitious.

At one time or another a lot of the officers and men of Naval aviation have lived on Santa Maria or on some advanced base like it. Since these small, green, tropical outposts thousands of miles from home provide a manner of living that is startlingly new to the average American, they are worth describing in some detail. Santa Maria is technically under an Army command although the Navy is numerically preponderant. In practice, the Navy runs its own show and simply observes the Army's rules and regulations about occupancy. The Army acts as a landlord, so to speak. For example, the Navy buys its food from the Army at a cost of 50 cents per man, and Naval officers, in turn, buy their food in the mess halls at the rate of 20 cents for breakfast, 30 cents for lunch, and 20 cents for dinner. The enlisted men are furnished food and, like the officers, quarters.

The military installations on Santa Maria are vast. The harbor is one of the best in the Pacific. There are several large piers; on occasion four big merchant ships will be unloading simultaneously, putting ashore the guns, ammunition and airplane parts that will be transferred to the combat areas and used against the Japs. As a rule the harbor is well filled with warships and numerous small craft.



Volley ball is one of the most popular forms of athletics on the lonely island bases—here's a game in progress at Munda.



Intelligence photos of Jap equipment are studied by a Bougainville Marine. Mail boxes are converted from rimmed-out cans.

Besides the Army installations on Santa Maria, there are several Seabee outfits, Marine aviation units, the huge supply organization known as Naval Advanced Base, and Naval aviation. Although there are several air strips and a seaplane base, there is little operational aviation on the island; mostly it has moved up closer to the retreating Japs. One Navy dive bomber squadron does operational work convoying ships in and out when the Army requests it. Other aviation on the airfields includes utility squadrons, New Zealanders, the Marine and Army transport or "SCAT." several squadrons in training,

Between strikes, VMF-222 pilots based on Bougainville while away idle moments with a typical leatherneck pastime—poker.

and the various maintenance units—"CASUs" (carrier aircraft service units). Field Overhaul, and so on. At Santa Maria, incoming aviation personnel receive last-minute training before going to the front, and combat squadrons frequently come back for replacements and to revise their tactics after skirmishes.

Santa Maria is an exceedingly busy place. Trucks, jeeps, and engineering equipment clog the roads, and the Seabees are working everywhere. They have done a particularly fine job here, having gone into a region that was undeveloped, except for a short stretch of coast along the harbor, and ringed and crisscrossed it with good roads. Using bulldozers and other heavy equipment they pushed back the jungle, rolled over enormous trees, and cleared large areas for camps and headquarters centers. To build the roads and air strips they used coral, which exists abundantly on Santa Maria. The resulting surfaces are relatively dust free, wonderfully smooth, and usable in any weather.

For the most part the military establishments are placed around the coast line of the island. The natives who formerly occupied this area have gone back into the hills. They are largely friendly, although occasional friction develops. There is still headhunting and cannibalism on some of the islands. However, nearly every pilot who has been forced down and thrown himself on the generosity of the natives has received good treatment. The European colonials, who formerly administered Santa Maria, now live along a restricted portion of the coast line. Most of them are copra planters and are rather indignant over the war and its inconvenience. A few of them have not stopped to consider that if the Americans had not occupied Santa Maria the Japs would have. We pay them $1¢ a tree for their coconut groves, which are not being harvested. All over the island are piles of rotting coconuts; in normal times these would be cooking in the copra sheds. A few of the planters are still trying to round up some nuts with the aid of Asiatic laborers who were imported before the war and who now live in a series of shacks in a coconut grove.

Naval officers and enlisted men live surprisingly well on Santa Maria. A great effort is made to keep up their morale with

(*Continued on page 203*)

Airpower Portraits

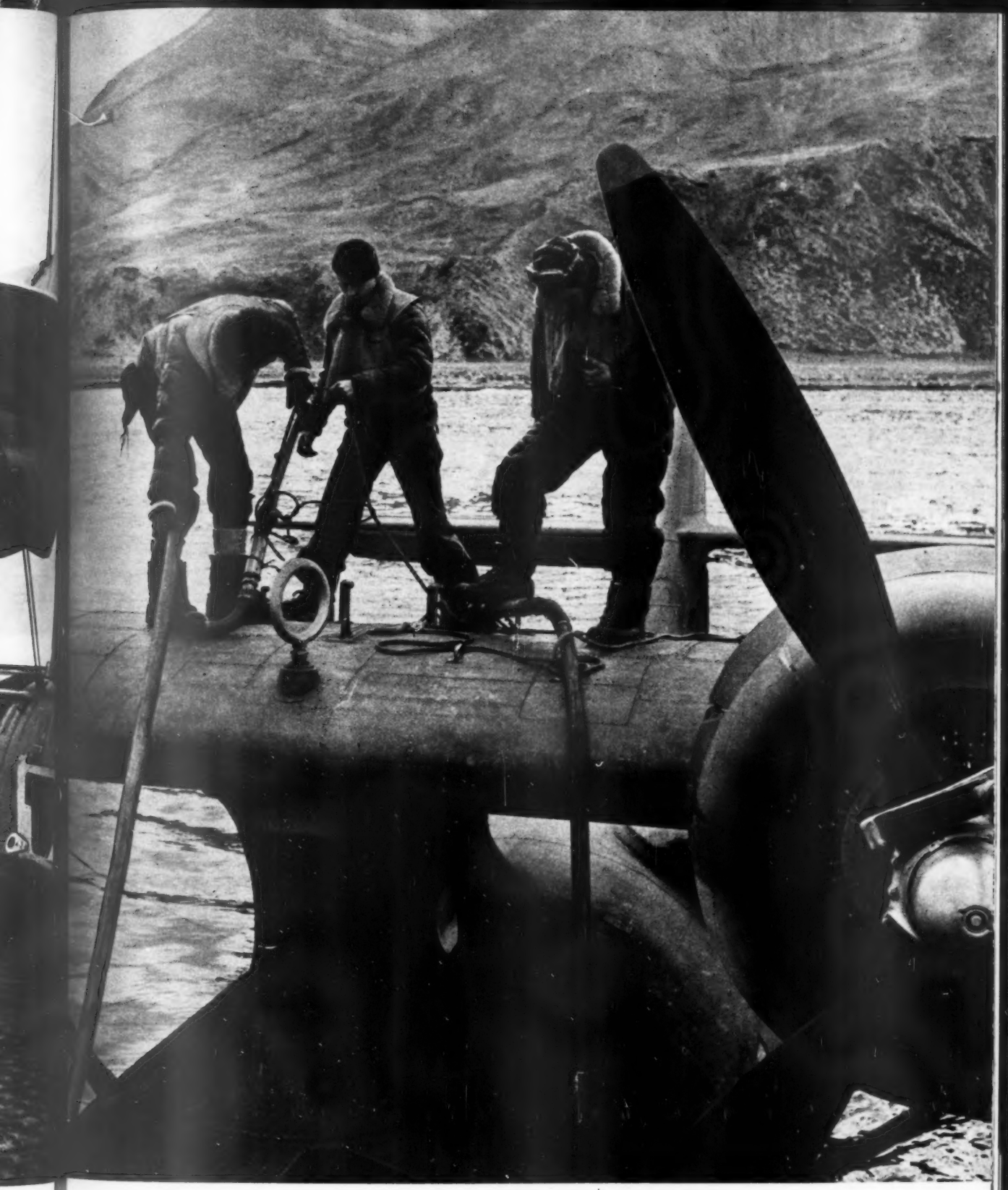
U. S. Navy photographers record the role of Naval aviation in the war.

Grumman Hellcats and Vought Corsairs, parked along a landing strip at Navy's large base at Espiritu Santo.

Pilot of a Dauntless, just returned from a scouting mission, discusses condition of his plane with carrier plane captain.

Flying southeast out of their South Pacific base, the pilot and co-pilot of this Ventura are on lookout for enemy ships or subs.

A Catalina and Kingfisher stand on a landing mat at an Aleutian base as fog rolls across the bay. Kingfisher carries small bomb.



Refueling a Catalina from a seaplane tender in the Aleutians. The tender services flying boats, houses their crews, tends PT boats.

Preparing to sail from a U. S. port, a combat carrier takes on the rest of its supplies. Planes' spare gas tanks are on lower deck.

Home looks like this to a Navy pilot as he circles for a landing at sunset. The carrier is a CVE, part of a convoy in the Atlantic.

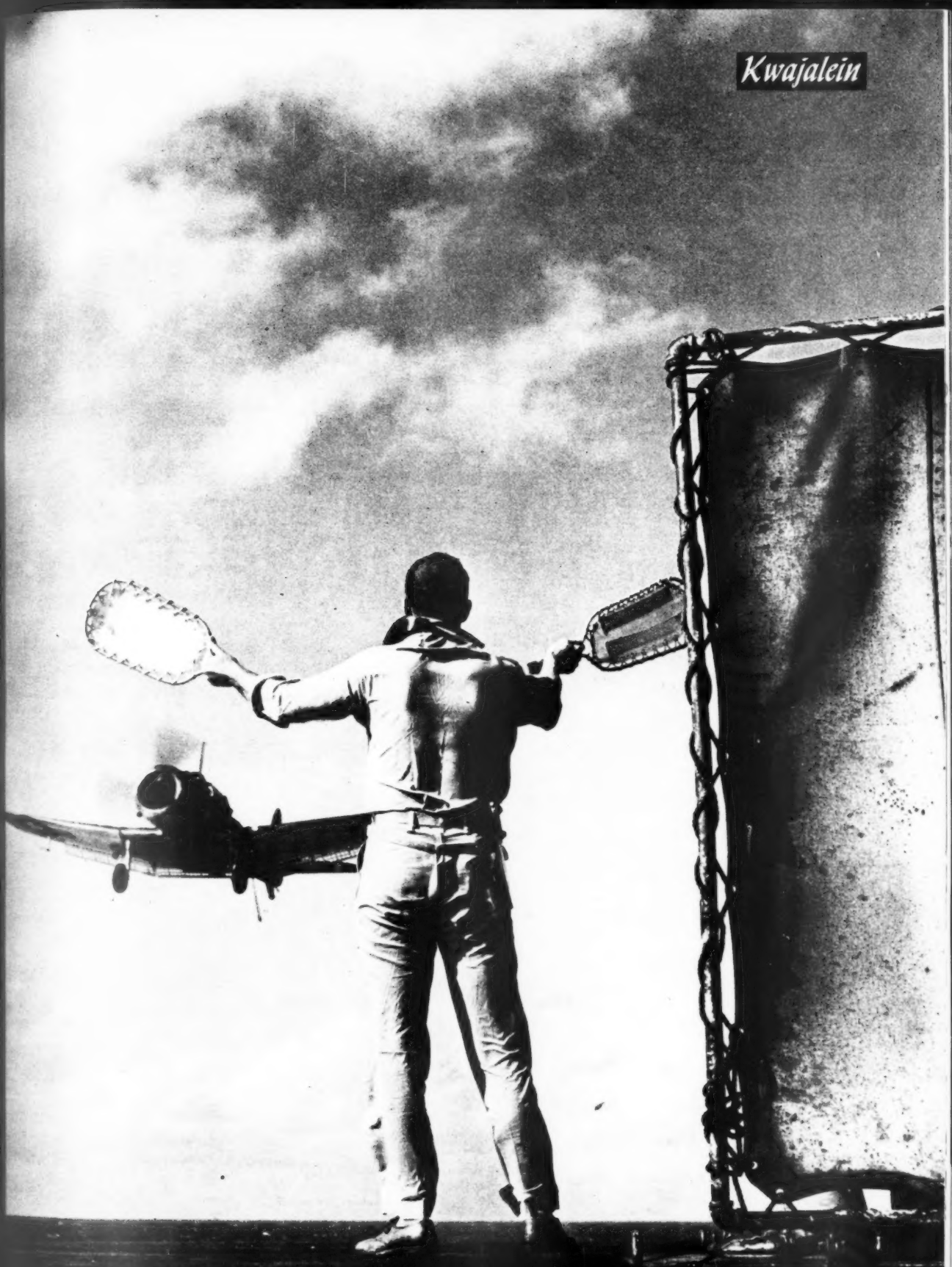
Wake

Returning to their carrier from a raid on Wake Island, these Dauntlesses dive-bombed enemy installations with their 1,000-pound bombs.

An Avenger climbs away from Wake Island after dropping its bombs on the airfield. Note low smoke from ship burning in the lagoon.

Bougainville

This Corsair, flying near its Bougainville base, belongs to the Marines' Blacksheep Squadron, which has just been reorganized.



A carrier's landing signal officer brings in a returning Dauntless. His signal indicates plane is making a perfect approach.

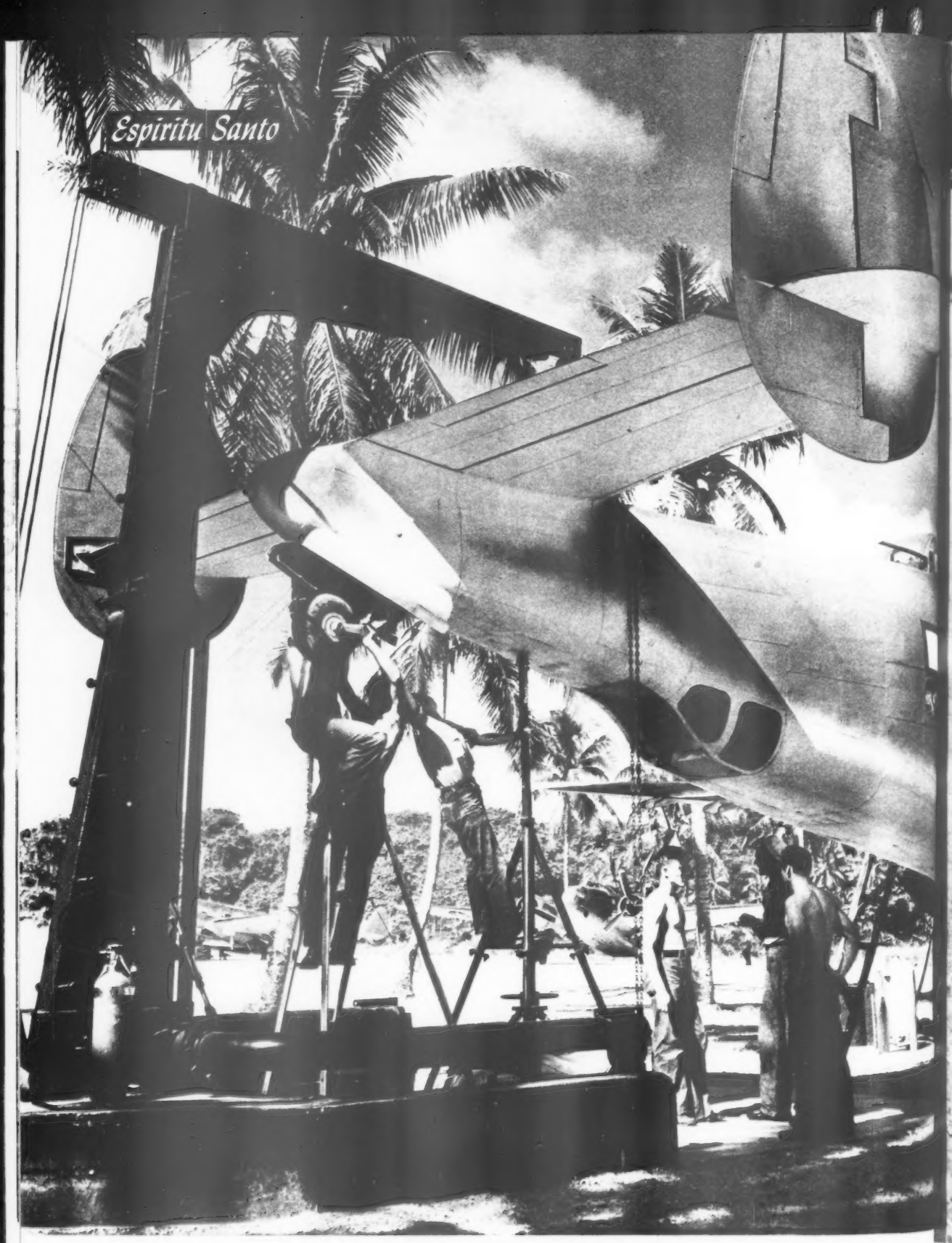
The Marshalls

As the task force steams away from the Marshall Islands, three Avengers circle for a landing on the carrier in the background.

As the task force steams away from the Marshall Islands, three Avengers circle for a landing on the carrier in the background.

Marcus

The carrier's landing signal officer has just given this returning Hellcat the "cut," and steps onto the deck to watch it land.

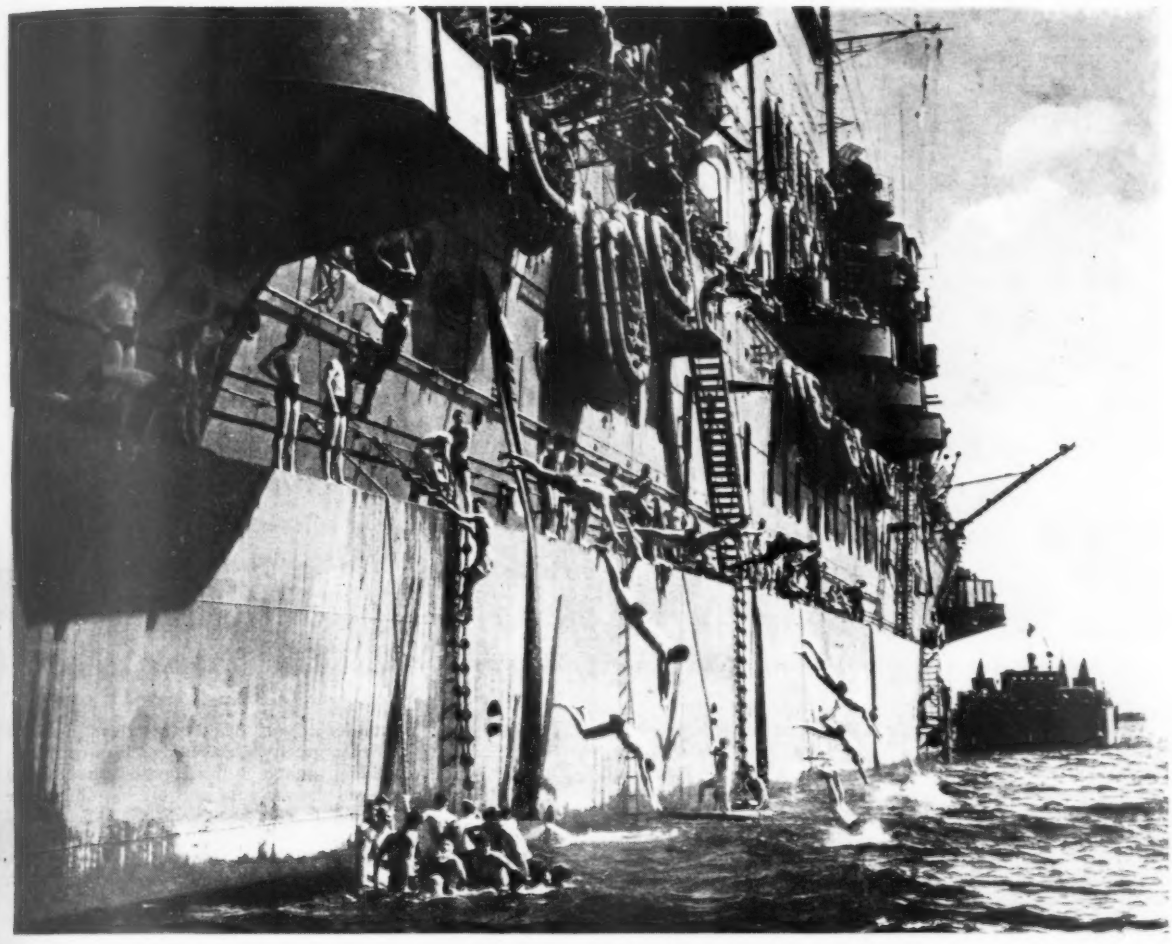


Ground crewmen repair the tail wheel of a Ventura. This crane is also used to boresight planes' guns. Espiritu is a large air base.

Caught by American fighters during the battle for Roi Namur, this Jap Zeke was forced down on the beach. The pilot later was killed.

Saipan

"Fireball Mac", an Avenger of Task Force 58, heads for Saipan. Three carriers can be seen on the water.



When sanitation conditions at anchorage permit, swimming is encouraged and the carrier's torpedo blister becomes a diving platform.

LIFE ON A CARRIER

There's nothing soft about life on these floating fortresses, but the food is good, friendship real, and the equipment tops.

NEW crew members aboard a carrier are likely to regard the flyers with a tinge of envy. Flyers receive extra pay, spend most of their waking hours in a cool ready room, and normally perform much lighter routine duties than those of the average junior officer.

As the new man gains experience he changes his attitude. He learns that the flyer's privileges are all based on solid good sense and that an aviator in his non-flying role shares alike with all others.

The flyer's ready-room is air conditioned and has comfortable reclining chairs, because frequently he must spend long hours there clothed in full flying gear, waiting for the order "Pilots, man your planes"—which may come any second. During those long hours he must be reasonably comfortable and able to stay attentive to instructions which may mean life or death to him and the ship. On duty, the ready room is his essential waiting room and office; off duty, it is a moderately comfortable club room in which to study, read, write letters, play cards, or "shoot the breeze."

Because he must be free to work at flying, and think and study about its problems, the flyer is not overburdened with routine duties. Paperwork and administrative detail would impair his combat efficiency. However, even the most junior officer takes his regular turn at running the squadron as its duty officer. He is also likely to draw at least one of the many other assignments that pilots must handle in addition to flying.

In his living quarters the flyer gets no particular concessions. Combat carriers are overcrowded. Rooms intended to hold two men frequently have one or two extra squeezed in; and bunk rooms are filled to capacity. Second and even third sittings at the wardroom mess are not uncommon.

Airmen accept the crowding, the hot sleeping and eating quarters, and the fact that their seagoing home is constantly in motion up and down. There are compensating factors. They are properly appreciative of the fact that, being ship-based, they may enjoy such real luxuries as a daily shower (if everyone is careful not to use too much water), clean bunks, coffee at any hour, and food of traditionally high Navy standard.

Officers at mess in the wardroom of an Essex-class carrier and a foreground view that shows something of the service they get.

A typical breakfast on a combat-zone carrier will provide a selection from fruit or tomato juice, eggs "any style," bacon, perhaps hot cakes, toast, butter, jam, and coffee. Noon and evening meals tend toward the "harvest hand" variety both in choice of food and in quantity, though occasionally the noon meal will be a hot weather menu, such as cold meats, cheese, potato salad, sardines, and iced tea. The evening meal may feature such staples as ham, pork or beef, peas and some combination of potatoes, applesauce, beans, and rice. Dessert is likely to be pie or ice cream. These are typical menus of one large carrier. Fresh green vegetables, such as celery, lettuce and onions, will be available in the first few days of a long cruise, but soon the supply vanishes and all vegetables come from cans or cold storage lockers where they have been stored while the ship was in port.

The flyer aboard ship drinks hot or iced coffee, iced tea, water or milk—the latter from a "mechanical cow" which

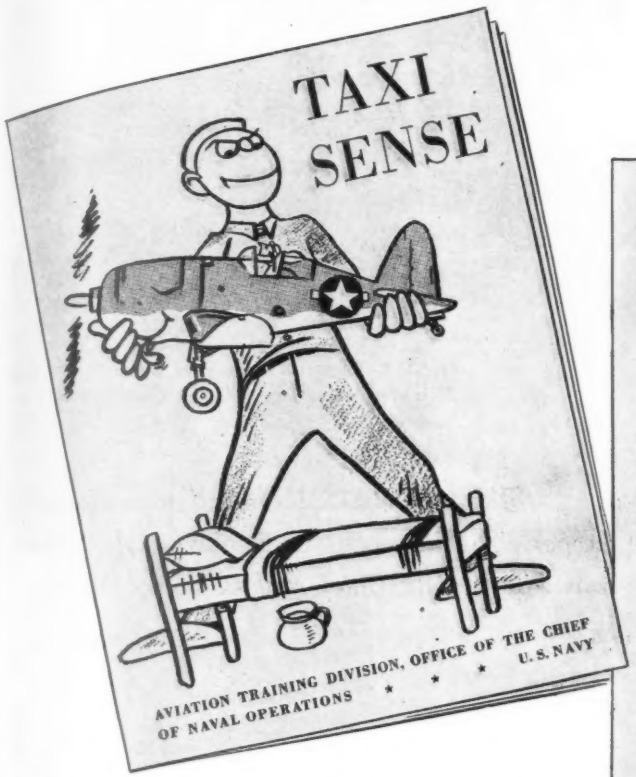
(*Continued on page* 246)

Ready room grouping of pilots who helped clear the air at Saipan.

Pilots eavesdrop on inter-plane talk of buddies on fighter sweep.

The SENSE MANUALS

Brightly-written manuals helped to train thousands of Naval aviators.



are indicated on charts." You can never tell, while hedge-hopping, when you are likely to run onto wires. Exploiting the many rather dubious uses of electricity, man by now has trussed up the world like a bale of hay, and he has done it promiscuously. There are, it is true, a few guides. In the neighborhood of any sizable lake or river, high tension wires are frequently found; big dams are also nerve-centers for high wires.

Lakes, incidentally, afford perhaps the least desirable of all places to Flat-Hat. When the water is slick no flyer in the world can tell accurately how far he is off the surface. It is hard enough when the lake is rippled, but a smooth water surface is a well-known death trap for aviators. There are numerous such cases on record, many of them involving drownings and all causing lamentable damage to airplanes.

Gay approach of Sense Manuals is illustrated by front cover of "Taxi Sense" (above) and page taken from "Flat-Hatting Sense."

THERE is a lot of common sense in the Aviation Training Division's Sense Manuals. These little pamphlets have won a permanent place in the esteem and affection of Naval aviation personnel and have attracted wide attention among the civilian population. Book reviewers and radio commentators have given much time and space to them. And in the Navy there is scarcely a ready room, a recreation room, or a class room in which they are not read.

Epitomizing the Navy's practical, common sense training program, sense manuals undertake to spread correct information in easily-understood, nontechnical language. Frequently they are as amusing as they are informative. A booklet on patrolling contains advice like this: "There is only one essential difference between patrolling over enemy territory and patrolling at home. Over enemy territory, somebody is likely to shoot you." To a youngster who has been pumped full of theoretical aerodynamics, great circles, engine pressures, and differential calculus, such friendly language helps maintain a balance. He reads on: "The best way to prevent this is to shoot the enemy first, and consequently it is a very good idea to keep your guns in working order."

Such instruction does not amount to world-shaking commentaries on military tactics, but it will bring a theory-soaked young pilot back to the matter-of-fact realities of fighting. When he looks at his guns he may not recall that "the ballistic coefficient of a .50-caliber projectile is the ratio of the performance of that projectile to the performance of a theoretically conceived missile whose performance quotient is said to be unity." But he will realize that he can kill more Japs with a clean, well-serviced gun than he can bore to death with ballistics.

Again, in a manual on how to bail out of an airplane in an emergency: "A long, tender farewell may mark you as a kindly, sensitive human being when you are saying goodbye to your girl(s). It will mark you as a blithering idiot if you employ it when leaving your plane." The idea, as further elucidated by the text, is this: when time to bail out comes, waste no time about it. Do it.

Sense manuals are the product of emergency. Peacetime demand for airmen never could keep up with the available supply. Flying training began with the selection of the cream of the crop and proceeded in a leisurely, relaxed course of study and training which allowed time for a young man to go through a process of mutation from a ground to a flying animal. Instruction was detailed and exact and there was plenty of time for the cadet to assimilate long, technical books. But when the war came, and with it the screaming demand for more and more airmen, the whole training system had to be streamlined.

Pilots still had to be trained thoroughly, but they did not have the rest of their lives in which to acquire such training. Under the aegis of Capt. (now Rear Adm.) Arthur W. Radford, the Training Division of the Bureau of Aeronautics is generally credited with putting through the streamlined training process. Among other innovations, he caused to be formed the Training Literature Section which was headed by Lieut. Comdr. (now Capt.) H. B. Miller, who gathered a group of professional writers. When Captain Miller was detached for service abroad, his place as head of the section was taken by Capt. W. R. Hollingsworth, veteran commander of a dive-bomber squadron. This change is in line with the Navy's policy of heading the training activities with battle-experienced officers.

On the whole, the writers were an unusual group of reserve

(*Continued on page 262*)

AFRICAN WING-DING

Everybody spent their spare time decorating the place. Pilots brought odds and ends from Lisbon and the States.

The new NATS base had to be launched properly. So in proper U. S. Navy style, a party was staged, with Chief Makrai doing the honors.

SOMEWHERE IN AFRICA.

THE mainspring of the whole show, from getting the recreation hall started to telling off the Admiral's chief yeoman, was Chief Boatswain's Mate W. M. Makrai.

The station is one of the Navy's newest and smallest advanced Naval Air Transport Service operating facilities—on the western coast of Africa. Eight officers and 50 enlisted men service the giant seaplanes that put in for fuel and minor repairs. They are quartered on the outskirts of the town in an ex-school house and a dozen Army-style pre-fabricated huts. It is, from all outward appearances, a fairly bleak looking set-up. But they manage well.

In the city is the Admiral's Mission, with 10 officers and a dozen enlisted men. The enlisted men are headed by a chief yeoman.

Unofficially, it is said to have been Chief Makrai's wangling that resulted in an extra pre-fab hut being set up and turned into a recreation hall. Painters, carpenters and others put in all their spare time decorating the place. A bar was built, pin-up girls were clipped carefully and pasted tastefully along the walls for decorations. Red Cross girls hand-sewed the curtains. Pilots from Lisbon and the States brought odds and ends to add to the comfort and appearance of the hall, and soon even Chief Makrai was satisfied—almost.

"We got to have a dance to launch it," he announced. A dance meant, first of all, an orchestra. There was no orchestra but there was a guy who could play a violin. And somebody knew a man over at the Army who owned—and could play—an electric guitar. An RAF pilot had a full set of traps and was practicing to play them like a real jive band drummer. A piano was borrowed from a local colonial. The news spread rapidly and everybody was eager to lend a hand.

"It's going to be an enlisted man's dance," announced Chief Makrai. "And we are going to do it right. We are going to invite the Admiral—formally." He turned to a yeoman 2/c: "Hey, Mack, knock this out on your typewriter. Quote: The enlisted men of the Navy request your presence at a dance in honor of the launching of the new Recreation Hall at NATS Facility, Saturday evening at 2100. RSVP. Unquote. Yeah, that's the ticket. RSVP. Classy?"

"Naah," said the yeoman. "'RSVP' means everybody's got to answer, and then we got to answer. Just more paper work."

"Okay," said the chief. "The hell with the RSVP. Make a batch of carbons. Send the original to the Admiral and the carbons to the other officers."

"What about dames?" asked the yeoman.

"Sure, dames," said the Chief. "We can count on two Red Cross girls, at least. Maybe four. And all you Romeos can get busy."

"Y' mean invitations for the dames?"

"If they want 'em, sure," said the chief. "But if they'll come with a word-of-mouth invitation it will save paper work."

The orchestra was assembled and rehearsed and the excitement grew.

A few days before the dance the skipper of the station sent for the chief.

"The admiral is very enthusiastic about this dance," he said. "Both he and his wife are dead set on coming."

The chief grinned. A vice admiral of the United States Navy who also heads a special diplomatic mission is not bilge when it comes to social prestige. Many big-wig hostesses over town had jockied themselves half blind trying to get the admiral to attend one of their shindigs. Makrai's party was now certain to be a success.

"But," continued the skipper, "the admiral's wife was wondering about that chief yeoman down at the mission. According to her, the chief was a little miffed because he didn't get an invitation, too."

Chief Makrai stopped grinning. "You mean that the chief yeoman didn't get an invitation yet, sir?" he

(*Continued on page* 268)

The boys told off the admiral's yeoman with so much gusto that he stayed home.

Pilots and their dates sit on terrace at Glen Innes, an estate loaned to the Navy on the outskirts of Auckland, New Zealand.

REHABILITATION

Navy provides week-long rest periods for Solomons flyers in Auckland or Sydney between their three six-week duty tours.

THEY call it "rehabilitation" but everyone admits that there isn't a good word for it. To Navy and Marine flyers it means rest and relaxation and getting in shape to fight again.

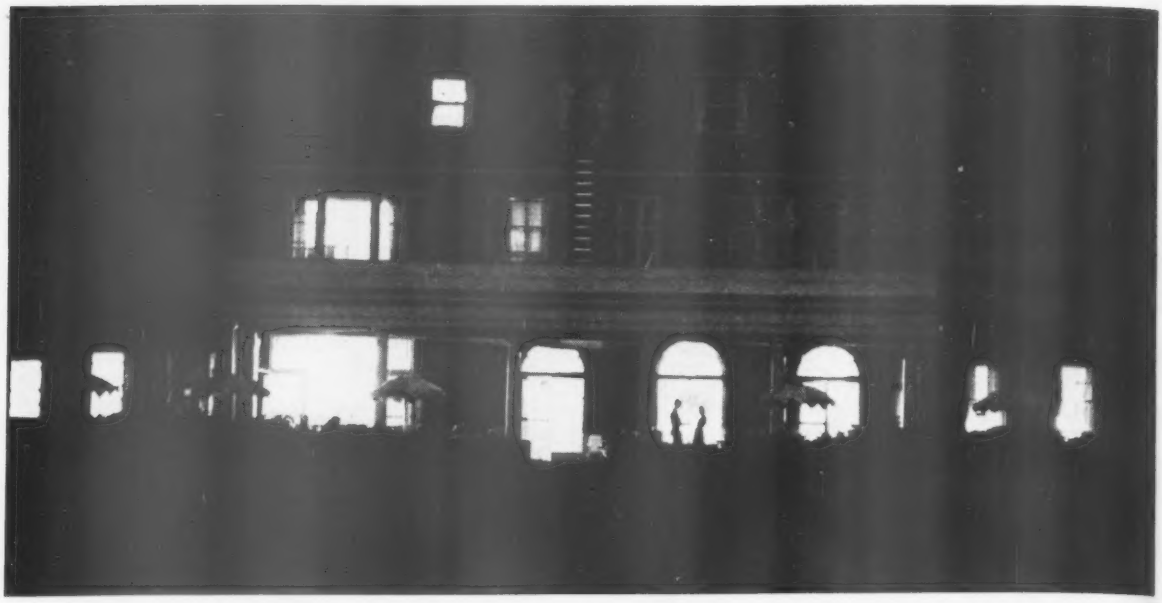
The Navy-trained pilot is considered by many to be the best in the world. But he is also a human being and therefore vulnerable to the common ills of man. These ills include nervous and physical exhaustion which sometimes piles up rapidly on the young minds and bodies of hard-driven aviators in the South Pacific.

Pilots on a carrier may fight until they are worn out but afterwards comes the long voyage home and a week or so in port. When the fleet is in they take their rehabilitation where they find it.

This has not been the case with combat flyers in the Solomons. There pilots fly a succession of strikes over shark-infested water against an enemy who is generally around 200 miles distant. It is dreary enough to dive straight down into ack-ack or on shipping in a Jap harbor; having to come back and concentrate on navigation is even worse. Tomorrow they have to do it all over again and with no fun in between—unless it is fun to sit on a soap box in the rain and watch an ancient movie. Frequently, further gaiety is added to their lives when Jap planes come over and everyone hightails it for a fox hole that is already inhabited by land crabs and thousand-legged worms.

All these conditions represent the worst aspect of the South Pacific and one that is disappearing—but at the very best it is not home. Consequently, the Navy early recognized that a program of rest and change was needed for the pilots in this area.

In the spring of 1943 Admiral Halsey sent Comdr. Tom Hamilton, the man who organized the pre-flight athletic program, out to have a look. Commander Hamilton saw plenty and recommended relief. Admiral Hardison, then of ComFair-



Every night is open house at the pilot's rest home, Glen Innes, overlooking the bay on one side, Mt. Rangitoto on the other.

South, took up the cudgel. Along with Lieut. Comdr. Sam Barry, an athletic officer who used to be football coach at the University of Southern California, he surveyed the rehabilitation possibilities in New Zealand and Australia. Admiral Hardison made accurate appraisals of the housing and food situations, transportation, co-operation with civilian agencies and so on—all the things, in short, that would enter into a rehabilitation program for overwrought, tired and nervous combat pilots.

As the result of these surveys, rehabilitation camps for Naval aviators were opened in both New Zealand and Australia. The custom now is for an aviator to spend six weeks at the front and then he is given a week's rest at one of the camps. The program started in New Zealand October 23, 1943. By March, 1944, the biggest center had handled 240 officers. During this same period 256 enlisted personnel, most of them rear seat gunners, found recreation at the Inner Domain barracks in Auckland or had gone to other New Zealand centers such as Wellington, Hamilton or Rotarua. And the Australian operation is much larger. Nine hundred officers and enlisted men go there each month for a view of Australia and a swim in the rolling surf at Sydney.

"Snack bar" is a Glen Innes institution. Each man makes his own sandwiches and two kinds of ice cream are on hand at all times.

The pilot himself elects where he will go. He may choose the beautiful rest home at Glen Innes on the outskirts of Auckland or the more cosmopolitan air of Sydney. Glen Innes is the estate of Kenneth Meyer, the use of which is given without charge to the United States for a rest home for service men. Possibly a pilot will try Auckland the first time and Sydney the next; for the plan provides three six-weeks tours of duty interrupted by two one-week rest periods "Down Under" before the squadron is sent back to the United States for reforming.

If it's Auckland they will be met by the liaison officer, Lieut. Don Cooper, who was formerly a quarterback for Kansas and played in the first Cotton Bowl game. As athletic director for Southwestern University and later for American University, Lieutenant Cooper learned how to put boys at their ease. It's well that he can do this, for when they first step off the plane the flyers need an understanding guide. Some will be popping with questions, others strangely silent. The strain of combat affects them differently.

Lieutenant Cooper convoys them into the beautiful Glen Innes home, where they meet Mrs. Madge M. Haney, the gracious and capable director whom the Red Cross put in charge. One of her assistants is Miss Janey Stecker, who has the incoming guests register and then hands each of them a little silver pocket charm which was designed in imitation of the Maori "peka peka," a device that was fastened to a leg of hunting falcons to assure their safe return. Navy and Marine Corps falcons who leave New Zealand and return to combat always keep their peka peka with them on hops; they say it is as effective in bringing them back as "Ensign Bendix," their automatic pilot.

Everything at Glenn Innes is calculated to bring bodily relaxation and peace of mind to overwrought youngsters. Among the favorite conveniences are the blue and green-tiled shower baths. At the Solomon bases flyers bathe on open-air platforms that look a little like the village stocks; at Glen Innes they duck into the pastel privacy of the hot and cold showers and luxuriate for hours. Out of their windows they can see the lofty slopes of Mt. Rangitoto and in between are the comfortable green pastures of the pleasant New Zealand countryside.

(*Continued on page* 268)

GHOST PATROL

Flying its lonely search pattern far out over the Atlantic, this Navy Liberator hunts enemy subs and shipping.

This is the story of an operation by search planes that will go down in Naval aviation's air-war history.

Ghosting over the South Atlantic, patrol planes sighted a strange merchant vessel. That night the U. S. destroyer Somers *caught up with her, recognized an enemy, opened fire with five-inch guns . . .*

Time Magazine
14 February, 1944

IT WAS a desperate gamble but Hitler's factories were desperately in need of supplies. And the fast-dwindling Nazi merchant fleet was not improving the supply situation by remaining safely tied up at wharves here and there. Some of their ships, ranging in size from the 3,700-ton *Alsterufer* to the 7,000-ton *Weserland* were in Far Eastern ports where Germany's honorary Aryan brothers were in control of untold wealth in raw supplies. Apparently, in the late summer of 1943 the little fleet of merchantmen had loaded up with rubber, oils and other commodities so plentiful in the Far East and needed so desperately in the West.

That much of the problem was easily solved. The next step required planning. There was half a world of ocean to traverse before they could make a friendly port. There also were a couple of hostile bottlenecks in the oceans through which the ships must pass.

First, the southern tip of Africa must be rounded with British air and surface craft in those waters to be dodged. And one could not know in advance just how far out the patrol extended. But necessity dictated the decision and they started out.

Five sturdy Aryan ships loaded with precious raw material for *der Fuhrer* successfully rounded the Cape and steamed into the South Atlantic Ocean.

The next obstacle was the passage through the narrows between the bulge of eastern Brazil and the hump of western Africa. It is a wide enough stretch but about half-way across the broad expanse lies Ascension Island. It is British-owned, but the Germans know every square inch of it. Had they not mined quicksilver there for years? There was no base on Ascension—yet, you never could tell.

"We shall know," the *herr kommander* decided.

The *Alsterufer* would proceed northward, exactly halfway between Ascension and the Brazilian Coast.

Meanwhile, Lieut. (jg) Joe Gentilini, Naval aviator, was making a sweep west of Ascension Island, looking for submarines in those waters. Lieutenant Gentilini knew that if the subs passed between Ascension and Natal, somebody would sight them. The squadron had established a record along those lines. Nothing—Ally, neutral, or enemy—had passed Ascension without being sighted.

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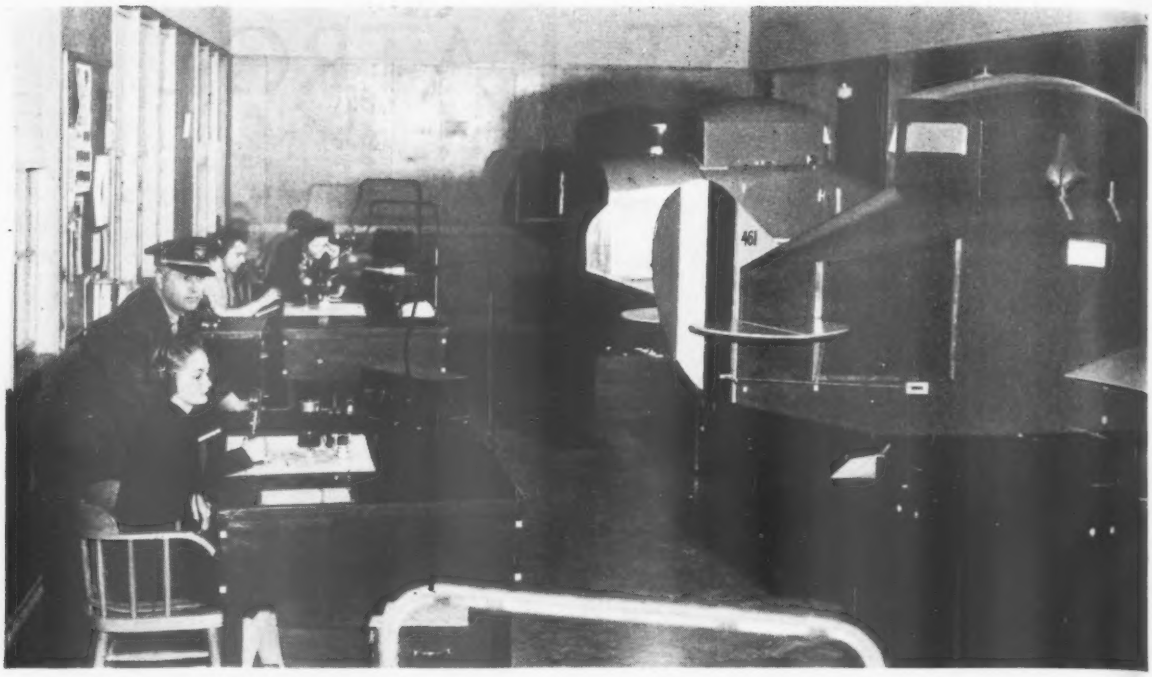


WAVE operates Link Trainer at Naval Air Station, Grosse Ile, Mich. WAVES are especially adept at this kind of instruction.

THE WAVES

More than 16,000 WAVES work for Naval aviation as mechanics, riggers, aerographers, instructors and control tower operators.

AS PROFESSIONAL women and technical specialists, the WAVES play an extremely useful part in the Navy war effort. In Washington, where many are called but few would choose to go, they report with good spirit. In this center of Naval aviation, the attack begins as an idea, a design in blueprint, an order on requisition. Call it paperwork, if you will. In the end, it's dynamite.

In engineering, maintenance, training, photography, administration, publications, transportation, aerology and research, the WAVES take their place as specialists and technicians. Can a woman do this kind of job? The Navy emphatically says, "Yes." Seated at their desks and typewriters, standing in the darkened rooms of photographic laboratories, working at drafting boards, WAVES in aeronautics, "chairborne" though they be, turn out superior and important work.

One section of engineering wanted a WAVE ensign with newspaper experience and good elementary knowledge of airborne electronics—a combination only an engineer could dream up. But the Women's Reserve filled the billet—adding for good measure, light hair, blue eyes and a capacity for hard work. Another division wanted a WAVE to write movie script for training films. Into their division came a comely lieutenant, recruited from the advertising staff of a national magazine, who could write that kind of script with one hand. It began to look as if no job was too tough for the WAVES.

While paperwork is the dominant task of the Bureau of Aeronautics and the office of the Deputy Chief of Naval Operations (Air), WAVES have reported for other duties at Naval air stations throughout the U. S. Originally, because the Navy had not yet plumbed the possibilities of women in uniform, WAVES were to be used only on white collar jobs. But BuAer had a bigger idea. Swiftly, thousands of girls were trained for jobs as ground crewmen.

The beauty operator from Waukegan can't pilot Comdr. "Swede" Larsen's plane, but she can be one of the ground crew that readies the training planes of future Larsens. Telephone operator, waitress, comptometer operator, invoice clerk, counter girl, milliner's helper, receptionist—these and countless other jobs WAVES filled in civilian life. Now enlisted in the Navy, they report aboard as aviation machinist mates, metalsmiths, instrument workers, gunnery specialists, Link trainer instructors, parachute riggers, control tower operators, aerographer's mates and "pigeonmen."

That last rating may sound whimsical in a branch of service where men fly and pigeons would seem to have nothing to do with it, save perhaps as innocent, airborne bystanders. But pigeons are carried on the big, rubber-enveloped blimps to act as silent, swift communicators to bases ashore. Where there are pigeons there must be keepers, and the keepers now WAVES. Strangely enough there were WAVES who in civilian life raised and trained pigeons. With Navy breeziness, they have, for some reason, now popularly become known as "widgeons," although their actual rating is pigeonmen.

From the time an aviation cadet begins his training, he finds WAVES some part of every phase of it. One very important part is his work in the Link trainer, which is manned by a WAVE instructor. Other WAVES will schedule his flight and log in his flight hours, direct his take-offs and landings, pack, check and issue his parachute, check and record his grades, check, refuel and make minor repairs on his plane, give him

WAVE ensign analyzes weather map before making local forecast.

his pay and make out his allotments, and instruct him in mathematics, celestial navigation, instrument flying and free gunnery.

At Whiting Field, an auxiliary air station at Pensacola, 40 WAVE "mechs" are charged with the entire responsibility of one flight of 20 planes. Whiting is big. The air is hot and gritty, and scores of bulldozers roll up the dust. But for all that, WAVE "mechs" are on duty there 12 hours a day and seven days a week (with an eighth day off). Almost all of them are plane captains. Assigned to a certain plane, a WAVE develops pride and devotion for it. So confident are the pilots of this particular service that many continue throughout their Navy flying career saying, "We'd rather take up a plane that has been serviced by a WAVE."

The WAVE plane captain must be a master of detail. Before the plane departs, she goes into action. She warms up the engine, sets the controls, and checks and initials the daily inspection form. She knows that every one of the 66 items on the check list must be in working order. After she has certified the plane ready for flight and turned it over to the pilot, she removes the chocks and signals it off. When the plane returns, she signs the pilot in. After he leaves, she checks his report, refuels the plane, checks the switches, wipes down the struts, cowling and airscoop, windshields and sides of the plane. She reports any trouble and stands by to aid in repair. It is a "man-sized" job, but sometimes the women do it better.

Other WAVES serve as engineers and riggers. The latter check the plane for cable frays and damage to fuselage and wings. Others work on engines. In the Assembly and Repair ships, aviation machinist's mates, metalsmiths, and instrument workers adjust, overhaul or install combustion engines and accessories. They act as carpenters, painters and hydraulic gear mechanics. They do things they'd never dreamed of doing before and they do them well.

Gunnery training is another vital task performed by WAVES. Young pilots reluctant at first to learn from women instructors, have now changed their minds. That is the way it worked out at the Hollywood Naval Air Gunnery School in Florida. More than handling a pistol is required of the gunnery specialist. She must be able to fire a shotgun, belt and fire a machine gun, assemble and dismantle arms, and operate and repair synthetic tracers. Out on the turret range she is the teacher who shows the student how to fire at a moving target on a high-speed range.

This takes courage, too. One station is not likely to forget the time when a student gunner in sudden confusion turned his turret away from the target toward instructors and students directly behind him. The WAVE instructor, with battle-front coolness, ordered him to hold fire and then rushed to the turret to swing his gun toward the target and safety.

One WAVE proved that the way to a man's heart is through his parachute. An enlisted man at a lighter-than-air station was directed to the parachute riggers' loft to be taught how to pack his chute. When he entered the loft, he saw the instructor and looked a little contemptuous. But she ignored his look and said, "I'll teach you how to pack so pay attention." They started on the chute, and it worked out fine. Six weeks later they were married.

WAVES have become aerographer's mates, too, and have learned the principles of meteorology, weather codes and synoptic chart drawing. They have learned to take readings of meteorological instruments and make observations.

As control tower operators, WAVES have been dubbed "Sky Cops" and "Sopranos over the Atlantic." But their glass-enclosed vantage point is no ivory tower. The WAVE operator directs take-offs and landings rapidly and efficiently, designating the runways to be used. Because the WAVE is under pressure on a job that requires instant and unerring judgment, she is relieved after one hour of duty. Between hourly microphone watches she performs other duties in the tower.

In the low pressure chambers, WAVES do a high pressure job, for this duty involves heavy responsibility. They must be sure that oxygen masks fit each passenger, that the equipment is in good condition, that it is properly used, and that

(*Continued on page 322*)

WAVES in control tower at Jacksonville, Fla., Naval Air Station. Because of the job's pressure, they are relieved after one hour.

Course flown by pilot on anti-submarine patrol is checked by operations officer on his return to Espiritu Santo.

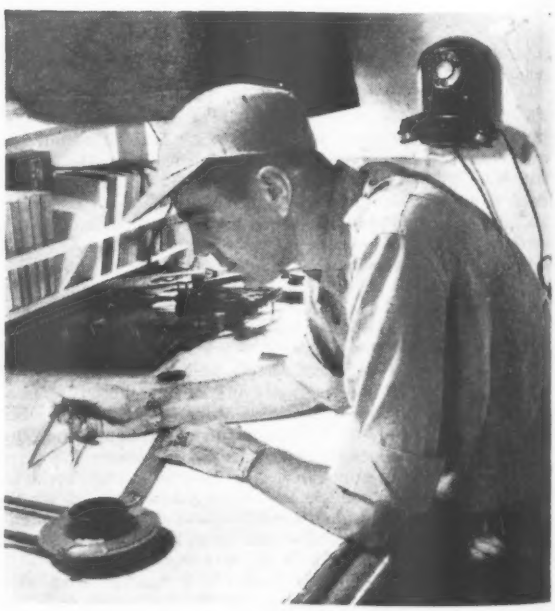
NAVIGATION

The modern Naval aviator can find his way anywhere on earth.

THE difference between navigating a surface ship that skims along the sea at 17 m.p.h. and navigating a patrol search plane that cruises the skies at 210 m.p.h. injected new problems in the practice of navigation. The war's urgent demand for thousands of Naval aviators, who not only could fly an airplane but who could take it there and bring it back, created new problems in training. Naval aviation solved both problems satisfactorily. Navigation was streamlined so it could be practiced in the cramped quarters of a speeding airplane. Teaching of navigation was stripped to the bare essentials and the most modern methods and devices were employed in the classrooms.

One of the big differences between surface and air navigation for the beginner is the mental hazard. If the novice aboard ship errs in a star reading or in his dead reckoning compilations, there always is time for rechecking by older and more experienced hands. If his landfall is not dead on the nose his ship will continue to float indefinitely. If everything else goes haywire, he can always "head west and find a continent." Naturally, sea navigation is not practiced that loosely in the Navy, but it could be without too many dire consequences. The navigator may receive a verbal keel-hauling for his errors, but unless he actually runs his ship upon the rocks there is not much chance of damage to life or property in minor errors in navigation at sea.

(*Continued on page* 192)



Navigator works over charts in office on bridge of a combat carrier during operations against Jap island fortifications.

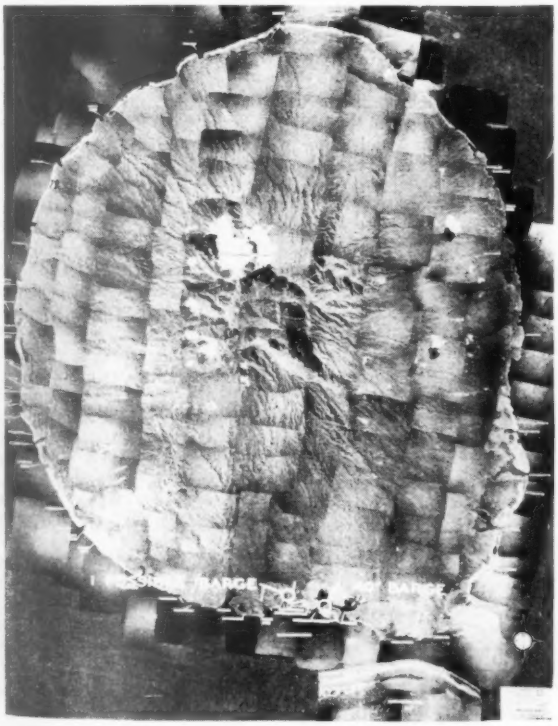
PHOTOGRAPHY

Spotting the enemy and "shooting" his installations, photo units help to plot the course for successful air invasions.

A MARINE officer once said, "The next candidate for the Marine Hall of Fame ought to be a Navy photographer." This remark takes in a lot of territory and a lot of Marines, but it is appropriate in appraising the role of aerial photography in current Naval operations. It is also indicative of the new stature assumed by the aerial photographer in modern military tactics. It would be idle speculation to assess the value of aerial photography in terms of lives, yet it is a safe bet that many a Leatherneck is killing Japs today because a Naval photographer's mate risked his neck to uncover secrets on some landing beach.

Fifteen years ago there were only 60 qualified photographer's mates in the Navy. Today there are full photographic complements aboard every aircraft carrier, on many other ships, with advanced base units, and at all Naval air stations. There are numerous photographic schools and, at the Anacostia Naval Air Station, there is a center for training that cantankerous, skeptical, and highly-skillful specialist known as the photographic interpreter.

The military value of aerial photography has been recognized since the beginning of aerial reconnaissance. Only recently, however, has it graduated from the gadget class to an established phase of military operations. Shortly before the Armistice in the first World War a ground officer returned a batch of aerial photographs to the Air Service with the scribbled comment: "Very pretty pictures, but there is a war on and I have no time for playthings." Recent estimates in the present fighting tend to indicate that 85 per cent of what we know of the enemy today may be ascribed to aerial reconnaissance photography and to photographic interpretation.



Shot at 20,000 feet, this mosaic shows island of Kolombangara. Its interpretation resulted in destruction of Jap troop barges.

In our South Pacific operations aerial photography was conspicuously absent as late as the summer of 1942. At that time the only photographic facilities existed aboard an aircraft tender and there were no suitable planes to utilize even that equipment. Early in 1943 a reconnaissance wing was shaped from Navy, Marine, and Army squadrons and a Navy photographic interpretation squadron. At Tarawa, in the fall of 1943, Naval commanders paid a great deal of attention to carrier-based aerial photography, including such phases as color photography and low altitude reconnaissance "strikes," or purely photographic flight missions.

Pre-war Navy photography was chiefly photography for the record. It consisted of depicting broken parts, gunnery practice, bomb drops, carrier landings, and so on.

Aerial combat photography—flying a combat photographic mission—has undergone many changes as a result of advances in airplane construction. In the old days it was relatively easy to poke a camera over the side of a plane flying at 80 to 100 knots and take a picture. Now photographers riding the rear seat of a *Helldiver* must manipulate a 45-pound F56 aerial camera in a 300-knot slipstream, and if it is a low-altitude mission the pilot is apt to be knocking coconuts out of the palm trees and playing tag with enemy antiaircraft. Low altitude reconnaissance with the pilot taking evasive action requires skill, experience, good equipment, and a real knowledge of photography.

Not all aerial photography requires the presence of a photographer in the plane. Fixed mounts and electrically-operated remote controls allow the pilot to take pictures without help. Fighter aircraft as well as multi-engined reconnaissance planes can operate on this sort of photographic mission. But a cameraman taking pictures at low altitude is only one phase of aerial photography, although it has been used increasingly by carrier planes in amphibious reconnaissance. Much of the work is performed on a photographic mission accompanying a combat strike, usually following the initial fighter strike against the target. It is hazardous work. A high percentage of casualties were suffered aboard one carrier in six months of operations in the Pacific. The carrier was commended for its photographic work by Commander, Central Pacific.

Photographers must work fast and know what the shooting is all about. Over Emiru, one pilot took 214 spot pictures with an electrically operated camera—an F56—in seven minutes. On a mission over Nauru, 155 usable exposures were obtained in less than 12 minutes. The photographic returns from the first strikes over Eniwetok, shot from low altitude, provided subsequent landing forces with sharp clear pictures of Jap defenses, which were blasted or neutralized by bombers and gunfire.

Photographers must look for such things as antiaircraft emplacements, revetments, shoreline defenses hidden under palms or camouflage, beaches suitable for landing, searchlights, pillboxes, and tell-tale pathways. High altitude reconnaissance provides the story on runways, hangars, concentration of facilities and shipping. If the photographic mission accompanies a bombing strike, the photographer must look for hidden or camouflaged shipping, spot all possible sunk or disabled shipping for assessment of damage, and obtain a photographic assay of destruction wreaked on landing strips and facilities. Concealed planes, reefs, and beach runs must be sought out for landing craft and photographed for future shelling and landing operations. Cloud formations which blanket the islands of the Pacific often make high altitude reconnaissance impracticable. The photographic plane then

Assembling photos into a mosaic, these technicians accurately map enemy troop and ship concentrations and surrounding terrain.

Photo technicians prepare developing tanks for "souping" of aerial photos in special trailer labs set up on Guadalcanal.

Navy photographer grinds out the record of a Jap attack on his carrier from a dangerously-exposed post on the ship's cat-walk.

must get its stuff at 200 feet, or barely above tree-top levels.

The camera is under no mental strain. It does not forget in the heat of combat. That is why pilots, particularly pilots new to combat, will view results of a photographic strike and exclaim, "Why, I didn't realize that was there!" It is also the reason that films from the first photographic planes back to the carrier are processed in "quickie" style. The prints are rushed to "Flag Plot," which is the intelligence center, and to the Air Group Commander and the Air Officer. From these prints—usually still wet from the developing tanks—ensuing operations are guided.

A carrier or task force photographic mission may originate at the operations plan for the strike. The ship's Photographic Officer suggests the number of picture-taking sorties which should be flown, their time of take-off, and the type of equipment deemed most useful. If the commanding officer wants reconnaissance for future landing operations, the Photographic Officer confers with the Air Group Commander for assignment of planes and fighter cover, or for the installation of remote control cameras on fighter planes. The *Helldiver* is considered ideal by photographers for spot work. Experience has shown that for these missions, however, the planes should carry no bombs.

The first pilots back from the initial fighter sweep—the first flight over the enemy territory—supply photographic information on weather conditions at the target, antiaircraft strength, and enemy fighter strength in the air. Usually, the photographic sortie goes out with the second strike and others will be flown as needed during the remainder of the operation. From the initial fighter photographs, decisions will be made regarding subsequent fighter and bomber strikes. For the most part, however, the photographic record goes to the intelligence centers for future operations and for assaying enemy strength and damage.

Close liaison between the ship's photographic officer and pilots of the carrier air group is maintained. The pilot must understand the operation of his remote control camera equipment, together with certain photographic techniques, and the photographic officer must have an appreciation of all-around aerial tactics and strike problems. Veteran combat pilots fly their photographic missions with the same painstaking care they would use in battling a Zero.

In land-based photographic operations, such as those of the South Pacific push through the Solomons, the close liaison

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SURVIVAL

These are Army airmen, rescued by Navy planes 66 days after they had been forced down at sea and had paddled ashore.

Ingenious life-saving gadgets, from fishing kits to sea dye, have saved the lives of hundreds of Navy pilots and aircrews.

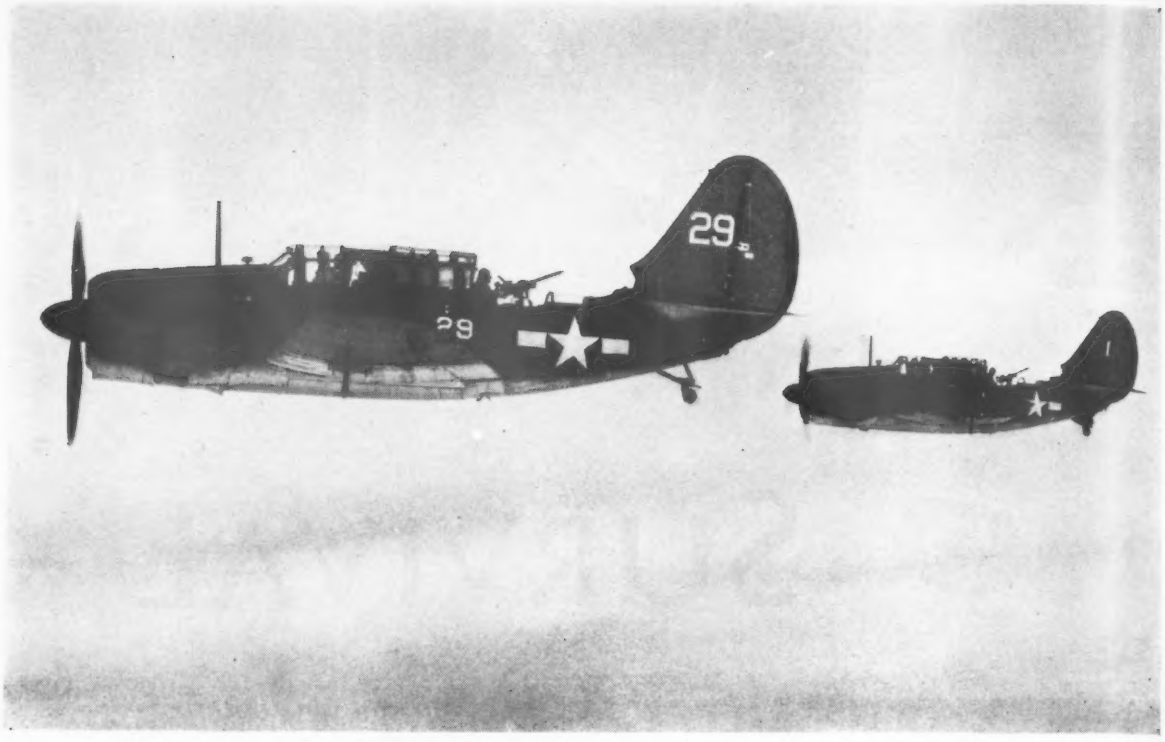
IN THE Pacific war, survival has come to mean ingenuity, the ability to get along under fantastic conditions, and just plain American guts. The Axis illusion that the American fighting man was soft and decadent has been dispelled by the repeated demonstrations of U.S. Naval aviators on how to beat the jungle and sea.

Some of the most spectacular exploits of the war have involved the individual process of survival. A few are real-life "Robinson Crusoe" feats. It is true that the story of some such adventures—human nature and American humor being what it is—have grown to epic proportions. A favorite story of carrier pilots involves a dunked flyer who bobbed about for hours in his rubber boat during a battle and was finally found slumbering peacefully and contentedly by worried rescuers. Another concerns a fast-thinking pilot downed in cold northern waters, where rescue and survival equipment include a bottle of brandy to ward off fatal chill. With rescuers bearing down rapidly, our hero hastily drained off the entire bottle of brandy at one gulp and was hauled aboard in the cheeriest possible frame of mind. The captain of the ship, guessing what had happened, but worrying for fear his dripping guest might remain too long in the open air, yelled "I don't want you on deck, young man. Get below at once." "Sir," said the bemused pilot, drawing himself up haughtily, "I will not stay where I'm not wanted," and dived overboard.

A musical note was introduced into survival by Lieut. George P. Sanders, a Marine Corps pilot from Oklahoma, who spent 15 days in a South Pacific island jungle after Jap antiaircraft knocked down his *Corsair*. Eight days after paddling ashore, and after experiences which included an uncomfortably close race with a crocodile, Sanders reached a native settlement. "For some reason," he recounted upon reaching base again, "the native children wanted to give me some presents, so about 50 gathered around and gave me a quantity of beads, sea shells,

(*Continued on page* 232)

Lieut. G. T. Polk, USNR, was forced down in Solomons, got back to his base 80 days later, guided by native who wears his flight gear.



The rear gunners of these Helldivers have their guns manned and a sharp eye out for cloud-hiding Jap fighters.

AIRCREWMEN

Aircrewmen, all trained gunners, relax aboard seaplane tender.

Aircrewmen do more than man the guns and radios of Navy bomber and torpedo planes.

BECAUSE newspapers and magazines always show him resolutely manning a machine gun, the public thinks he is primarily an air gunner. In the Navy he is known as an aircrewman and manning a machine gun is only one of his many important jobs. Technically speaking, he is an aviation rating who flies. He has to be a gunner because there is no place in any Navy combat plane for a man who can't handle a machine gun. Whatever you call him, he's quite a boy. Besides manning that all-important gun, he's a technician in some aviation specialty and actually serves as a supplementary set of eyes, ears, and brains for the flyer who commands his plane.

The rear seat gunner who shot a Jap Zero off the tail of a Grumman *Hellcat* was doing no more than is normally expected of a rear seat man. Thomas Reed, AMM3c (aviation machinist's mate third class), helped land a *Ventura* search plane after the pilot had been killed and two crewmen wounded. The co-pilot took over the controls from his seat while Reed operated the brakes from the pilot's seat and the two brought the plane in safely with some controls shot away. An aircrewman is apt to be called on to do almost anything.

In the first years of the war, gunners were recruited in more or less haphazard fashion, usually from the enlisted personnel of the large squadrons then being formed. Gunners were not necessarily aviation "rates." They might be printers, painters, storekeepers or any one of many other types of specialists attached to a squadron. The main requisite was an interest in flying and an aptitude for gunnery. Training in gunnery was done in the squadron or at gunnery training units in advanced

Even veteran gunners practice constantly. These turrets on Hawaiian beach are firing at target towed by a Dauntless.

areas. So rapid was the process of getting crews to man the tremendously-expanded flying Navy that aircrewmen of the larger planes frequently had no training as gunners. The pilot of a smaller plane might get a rear seat man who was both an aviation specialist and a good gunner but frequently a compromise had to be made which left much lacking in one field or the other.

Aircrewmen of today report to the fleet with nine months of solid training. This includes boot camp and four and one-half months of specialized technical schooling as an aviation ordnanceman, aviation radioman, or aviation machinist's mate. If the aircrewman intends to fly and fight he attends one of the Navy's three gunnery schools, at Yellow Water, Fla., Hollywood, Fla. and Purcell, Okla. In these schools he learns to operate every kind of aircraft gun used by the Navy. Here he is awarded the air gunner's sleeve insignia which is a mark of proficiency with aircraft weapons. Finally he is given two months with an operational squadron where he learns the tricks of flying and fighting in combat type planes. Here the aircrewmen normally train with the pilots with whom they are to fly in battle. When this stage is finished the crewman wins his coveted wings.

A bombing or torpedo plane in a battle area normally has fighter protection. Its basic purpose is to take its load of destruction and place it accurately where it will do the most damage to the enemy. If enemy fighters are numerous and determined enough to break through the friendly fighter screen, the aircrewman, together with the pilot, fight defensively to get the plane in and complete the mission. In such a situation, what the gunner wants from the pilot is a steady gun platform. "A pilot who zooms around a lot when an enemy plane gets on his tail is doing the wrong thing if his gunner is on to his job," commented one veteran crewman. "What the

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This Liberator top-turret gunner keeps watch during a search mission.

Recognition aids surround plane crews in ready room. Airmen must take refresher courses and keep training in the field.

RECOGNITION

Recognition is all-important when unidentified planes approach a task force at 300-plus m.p.h.

A SQUADRON of planes appears heading toward a U.S. task force in the Pacific. There is no radio contact. If the planes are ours they are probably in trouble and lost; preparations must be made to help them. If they are enemy, a few seconds delay may mean the difference between victory and defeat.

The admiral of the task force hesitates and turns to his recognition officer.

"What do you advise?" he asks.

"They're *Kates*, sir," says the recognition officer.

"Are you sure?"

The recognition officer has another look through his glasses. Behind him are months of training and a new but fine tradition that has been built up since the war began by Yankee ingenuity, college psychologists and a collection of practical recognition experts, which includes an ex-hotel executive and the manager of the baseball farms of the Cincinnati *Reds*. In a few seconds, the man on the battleship lowers his glasses.

"Fixed landing gear—never mind the details—they're enemy torpedo planes" he says.

The ack-acks swing into action. One *Kate* blows up in mid-air from a direct hit, another crashes in the sea and explodes. Those that survive miss their targets and fly off in ragged formation.

The Navy's recognition system, made in U.S.A. and a bell-wether for systems used by the Air Forces and ground troops around the world, has scored another victory.

This true story of recognition-in-action today is the rule rather than the exception. But the happy ending often failed to come off early in the war. Recognition was one of the least-known quantities in the entire panorama of war problems when the Japs struck at Pearl Harbor. In other wars it had not been an important factor. Soldiers in the War Between the States had only to recognize the color of the enemy's uniform and begin shooting. A vague knowledge of what the speed of the airplane was introducing into modern warfare was picked up by recognition experts in World War I and a few pamphlets were published. But until the shooting began in World War II nothing of importance was done about the recognition problem and nobody considered it important.

The British were the first to change their minds. They quickly learned the vital need for recognizing an enemy plane in-

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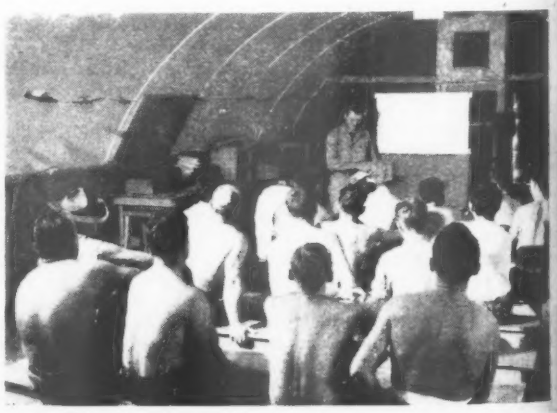


Marine gunners brush up on plane identification at recognition class conducted in Quonset hut at the Espiritu Santo air base.

the Navy's Best

TOPSIDE TRAFFIC

HANGAR DECK

THROUGH FOR THE DAY

THE 'SARA'

START OF A STRIKE

BORE-SIGHTING

HOMING HELLCATS

D-DAY, SAIPAN

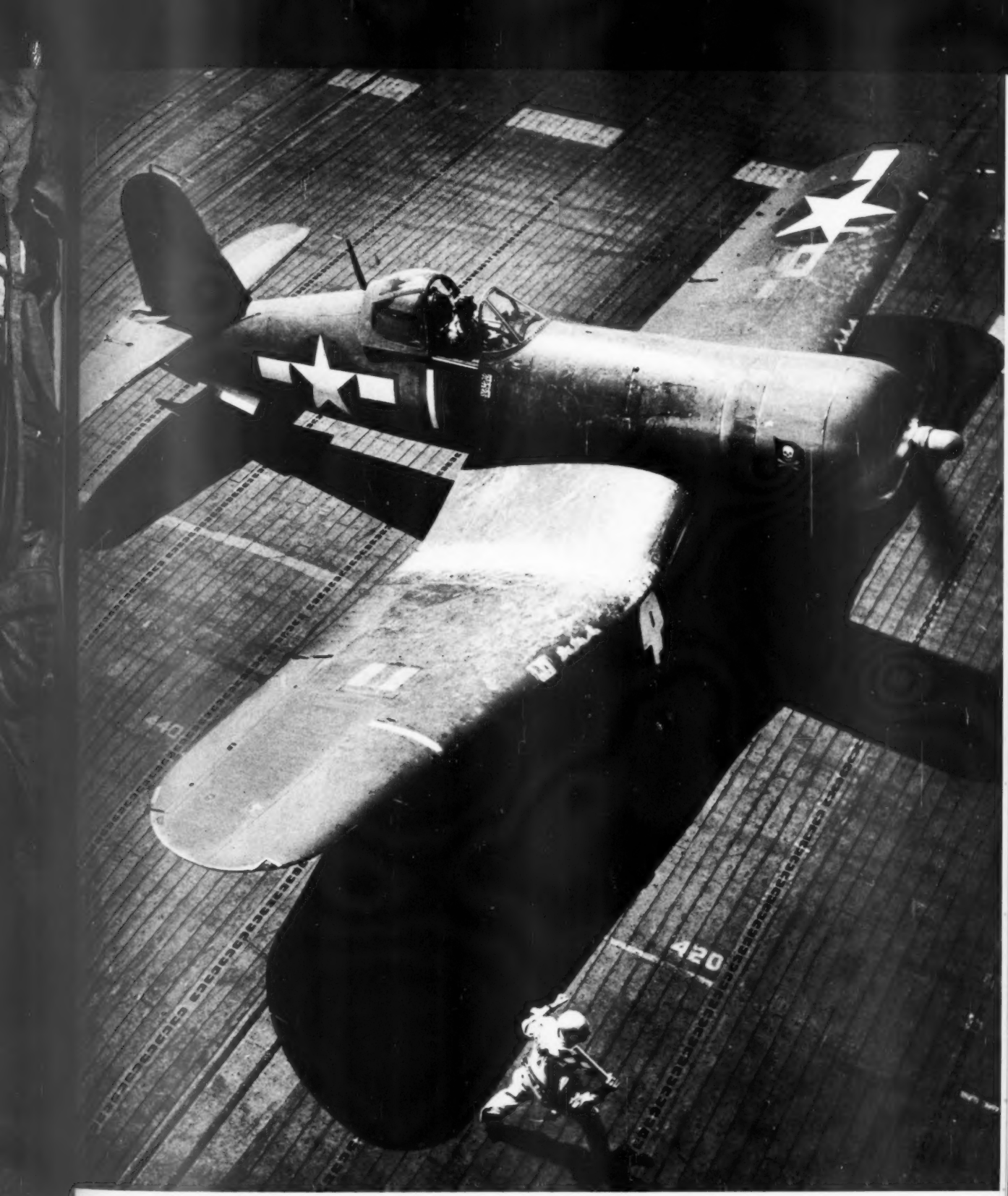
BOMBING UP

CHASING TAILS

MAN POWER

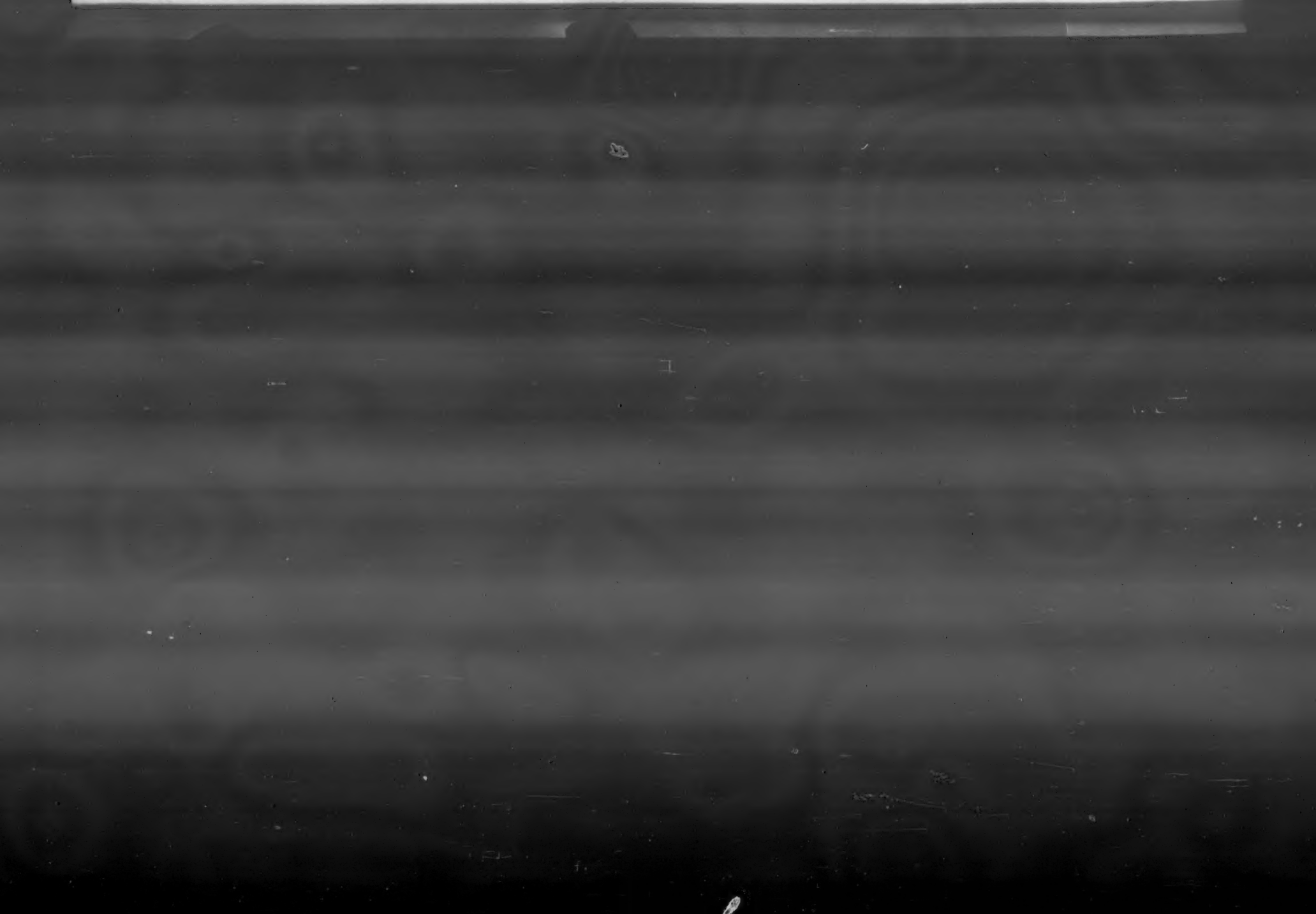
TARGET: WAKE

BRIEFING

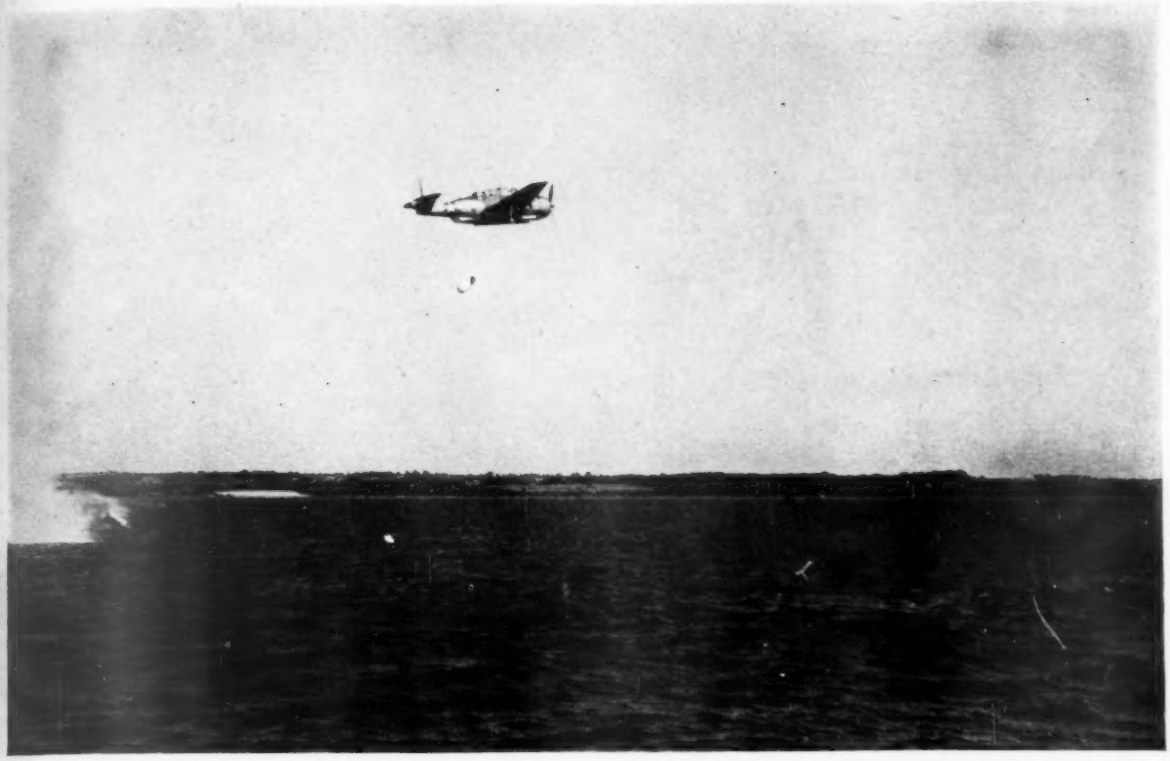


JAP KILLER

COMING IN HIGH



SAFETY EQUIPMENT



Drop test of the air-borne raft, AR-10, performed off Quonset Point, R. I. Note test crew in water (lower right) swimming to raft.

Navy materiel experts anticipate the emergency survival necessities of flyers downed at any point on the globe.

THE first thing they saw from the rescue plane was the green splotch on the water. As the plane circled, losing altitude, the pilot spotted the tiny bobbing blobs of men struggling in the sea. He put the plane into a dive, flattening out when he was about 100 feet off the water.

There were 10 men in the area of the green splotch, possibly the crews of several planes forced down in the course of a raid on the Jap island. As he passed over them, the pilot thought one man waved. He rocked his wings. Circling into the wind, he made a second run toward the green dye. The bomb bay doors were open now. Carefully calculating his aim, the pilot pressed the bomb release.

If the men in the sea had not known what was coming they might have thought they were being bombed. One, two, three, four—five yellow objects hit the water near the green marker. The tired men swam toward the yellow kits spread over the water in a long, easily accessible line, secured together by floating rope. Still circling, the pilot saw two of the men reach one kit. From now on it would be easy. Three more men had reached the kits and were using the line to draw themselves toward the others.

On the surface of the sea, as if by magic, a large, boat-shaped raft appeared from the first kit and the men clambered aboard. The others made their way to the raft and began pulling the remaining kits toward it. One man, too weak to haul himself aboard, had to be helped. The survivors were busy now. Two of the men set up the mast and begin to rig the sails. In the after section of the raft others were dismantling a kit from which they produced an outboard motor. As soon as the outboard motor was set in place it was being filled with fuel from another of the kits.

The crew of the rescue plane was jubilant as they saw the raft, powered by the outboard motor and the sails, head out to sea. The enemy shore was uncomfortably close but the men aboard the raft had the means now of getting away to a rendezvous point where they could be picked up. Aboard the raft was enough water and food to keep the survivors going for many days. They had first-aid kits, signal mirrors, dye markers, blankets, pyrotechnic signals and all the rest of the equipment the Navy's planners had provided for just such emergencies as this.

In a war which has left untouched virtually no spot on the globe, Navy flyers run into many emergency situations. The job of anticipating and providing for them is a big one. Rescue and survival equipment has to be provided for every one of the many Navy planes, ship-based and land-based, ranging from the fighter to the big patrol bomber. The fighter pilot, flying alone in his crowded cockpit, has no room for elaborate rescue gear if he is forced down at sea. The one-man life raft, designed to fit into his parachute assembly, is one answer to his

Prescribed by test crews actually set adrift in the Atlantic, these emergency rations would meet week-long needs of six men.

Secured to survivor by cords about his neck, these filter equipped plastic bags convert sea water into a safe drink.

problem. Multi-placed life rafts, easily inflated and seaworthy, are saving the lives of patrol plane crews forced to ditch.

In the Solomons, where our flyers fought within range of the *Catalinas*, it was a comparatively easy task to pick up crews forced to take to the life rafts. Now, when our carriers penetrate deep into the enemy's inner defenses many hundreds of miles from our own bases, the problem is more complex. It is not enough to provide pilots and crews with the means of staying afloat. They must have some method of getting away from enemy waters, and the ordinary raft is not suitable. The AR-10 air borne rescue assembly—the 10-man, droppable, power-driven raft already described—is one solution to the problem. In such a raft, skillfully designed to maneuver in rough sea, our flyers have a good chance of staying out of the hands of the Japs—even when, as has happened, they are forced down inside an enemy-held lagoon. This is only one of the new problems met by the engineers and designers who devise rescue equipment for the Navy.

The mind that designs safety equipment is never free to operate without giving prime consideration to space and weight restrictions. "If you put that in, something will have to be taken out," are familiar words. For, no matter how large the combat aircraft, its purpose is defeated if first consideration is given to safety rather than to the hauling of bombs and fire-power.

So it behooves the pilot to make the best use of what he has. An illustration of this point is in the story of the airship that effected the sea-air rescue of two Marine airmen. From the air it appeared that one of the Marines was badly hurt. The blimp was skillfully maneuvered over the raft at 25 feet, a line attached to the parachute harness, and the whole assembly lowered to the life raft as a boatswain's chair. The injured man was strapped into the harness and hoisted aboard the

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SEAPLANE TENDER

U.S.S. Casco, a small seaplane tender of the AVP class displacing 1,695 tons, mothers a Catalina at Massacre Bay, Attu Island.

Seaplane tenders house machine shops for making aircraft repairs, feed and quarter airmen and supply their planes.

THE U.S.S. *Chincoteague*, a seaplane tender, lay at anchor one steaming night in a bay in the Solomons. At that time the Japanese still possessed excellent island airfields in the area. The *Chincoteague's* mission was to act as a mobile advance base for a group of big Navy flying boats that needed daily servicing, refueling, rearming and repairing and to provide food and quarters for the crews. Operations proceeded smoothly and the American bombers plastered their targets successfully, but all hands knew their haven would be discovered by searching enemy planes.

The discovery came at night. A reconnaissance plane flew over and dropped flares. Early the next morning five Nip bombers came over. They released their bombs from about 8,000 feet but their aim was so poor that all bombs exploded harmlessly in the jungle, almost a mile inland. Four hours later nine more Jap planes attacked. Meantime, the *Chincoteague* had slipped anchor and was making for the open sea where she would have room to take evasive action. The nearest bomb exploded about 50 yards from the sternpost, causing minor splinter damage about the fantail.

The *Chincoteague* was of course much safer at sea but a flight of her planes was due to go on a mission that night and required servicing. In mid-afternoon she doggedly steamed back into the dangerously restricted waters of the bay. The planes were serviced. At dawn next morning five Jap planes attacked and the first stick of bombs bracketed the ship across the forecastle. The *Chincoteague* again was heading for the open sea but was battered by two more attacks before she could escape through the mouth of the bay. Gasoline lines on the starboard side were ruptured and the escaping gasoline was ignited. Splinter holes were blown in the ship's side. Fire parties attacked the flames and had just succeeded in putting them out when four more enemy planes attacked. However, their bombs all fell clear.

The patrol planes had to be prepared for another night mission, so back into the bay went the damaged *Chincoteague*. When nothing remained except to refuel the last three of the planes, this task was left to men in small boats and the tender hastened to get back into open waters. Within less than half an hour the tender was subjected to her seventh attack in two days. Five Jap bombers bracketed the little ship so closely that additional splinter damage resulted. The eighth attack was worse. The Nip bombers came out of the sun and dropped so accurately that a delayed-action bomb pierced three decks

In the Aleutians, Catalina snubbed by bamboo poles will take on gasoline from tender which also supplies Kingfishers, PT boats.

and exploded in the after engine room, killing all personnel there, including the chief engineer.

After this there was a respite of nearly two hours before the *Chincoteague* was attacked the ninth time, by three planes. The ship's antiaircraft fire forced one plane to break off, trailing smoke, but the two others came on and a 500-pound bomb put the forward engine room out of commission. Now the ship was without motive power and was lying dead in the water, an easy target. This last bomb also had injured some of the crew and had damaged the ship and its small boats. A tenth attack upon the helpless ship was made by a single enemy plane but its bombs missed by 200 yards.

With the after engine room flooded, some of the after compartments partly flooded and water pouring in through splinter holes, the *Chincoteague* developed a heavy list to starboard. All hands were put to work. Bucket brigades and "Handy Billy" pumps were put into operation. At 11 p.m. the main engines were turned over and 10 minutes before midnight the ship was under way on her own power.

About an hour later she was joined by the U.S.S. *Thornton*, which had been dispatched to aid her. That vessel sent a boat with additional Handy Billy pumps which were put into operation immediately. The *Chincoteague* moved along for nearly two hours, the *Thornton* accompanying her. Then fire broke out in the forward engine room, which had to be abandoned. Again the ship was unable to move. After three hours the fire was localized but still smoldering. The *Thornton* started towing the crippled *Chincoteague*, but had to break off to drop depth charges when a submarine contact was developed. Two hours later, the sub contact having been lost, she returned and started towing again, but the tow was cast off when the *Chincoteague* began listing badly. Although the bucket brigades still were working, they could not check the flooding. The stern was settling low, only two feet of freeboard remaining. Torpedoes, heavy machinery, winches, and other heavy gear went over the side to lighten ship. Additional pumps arrived aboard a flying boat that landed on the water near by. The bucket brigades kept working and the *Thornton* came alongside and supplied powerlines that enabled the *Chincoteague* to get her submersible pumps into operation.

The *Thornton* continued to lie alongside, refusing to cast off even when, late that afternoon, three Jap bombers appeared overhead and prepared to attack the two motionless ships. Be-

(*Continued on page* 284)

Repair crews aboard seaplane tender in Alaska area work on the beaching gear of Catalina bomber used to patrol island chain.

Pilots dine aboard Casco. Larger tenders of AV type, displacing up to 12,000 tons, tend as many as 24 planes over long period.

GROUND CREWS

Come weather foul or fair, it's the stalwarts of the PATSU's, CASU's, and MAG's who really "keep 'em flying."

"YOU men have the toughest job in the Navy. It's a filthy job. You'll damn near freeze to death in these Aleutian gales between now and the time when—and if—we get some hangars built."

The officer in charge of the PATSU—Patrol Service Unit—paused and glanced up and down the lines of his aviation machinists, radiomen, ordnance ratings, the plane captains and the engineering and administrative officers. He had called them together to "give them The Word," and he was giving it to them sans sugar coating.

"Furthermore," he resumed, "you won't get any decorations. You won't get any publicity. There won't be any stories in your home-town newspapers about the hardships that you endure to keep the planes flying. Nobody will know much about it except you and the pilots and crews that fly the planes. About all you will get out of it will be the satisfaction of knowing that you are doing one of the most important jobs in this war—something so important that the war can't be won unless you, and other men like you, are willing to tackle it and get it done in spite of all the hardships and difficulties."

Perhaps that doesn't sound like a very encouraging pep talk to give a group of men just beginning a tour of duty on a desolate, foggy, and bitterly cold island. But the young skipper knew the quality of his men. He had estimated correctly the way they would react to the frank disclosure of harsh facts. For the PATSU crew showed no sign of being discouraged by the grim prospect, but undertook the job with a zeal that did not flag when the going got tougher and tougher.

The big patrol bombers were making daylight day-long flights, which meant that much of the work on them had to be done at night. It was not unusual to see a shivering mechanic working with a wrench in one hand and flashlight in the other, bracing himself against a wind that would have blown the plane away if it had not been lashed securely. About 20 to 30 minutes was all a man could stand at a stretch. Then he had to seek shelter and a fire, to get his numbed fingers sensitive enough to perform delicate adjustments. The nature of the work made it impossible to wear cumbersome heavy gloves.

Aleutian winds with velocities of 55 to 65 m.p.h. are too common to excite comment. Sometimes they get up to 90 knots (103.5 m.p.h.). To lash down the planes, PATSU first got the Seabees to construct 100-pound concrete blocks with rings through which ropes could be run. That was in the early days, before the innocent crewmen had learned to appreciate the fury of atmospheric disturbances in that area. The next order was for 200-pound blocks, but they were inadequate, too, and eventually the Seabees were called upon to provide 1,000-pound blocks. As an additional safeguard, a dump truck was parked nightly on the windward side of each plane, its body slanted up to divert the full force of the wind and make it run over the top of the aircraft. The farther out that way you go, the stronger the winds get. A pilot who had flown out, hopping from island to island in the long chain, landed on Attu and paused to watch the ground crew lash down his plane. "Funny thing," he remarked, "those concrete blocks have been getting bigger and bigger all the way along."

In the rain at advanced South Pacific base, crewmen repair a Navy Liberator, used in search operations.

Beneath South Pacific palms and half-sheltered by a tent, Navy ground crewmen on Majuro Island repair a Douglas Dauntless wing.

Ground crewmen, enjoying temporary respite, watch Avenger torpedo bombers take off from Bougainville for a strike against Rabaul.

engines are always hard to start on those icy mornings. There are engine covers and machines that blow hot air under them but even so it often takes a long time to get a balky engine to catch hold. Often it takes three or four hours, immediately before a take-off, to rid a plane of ice. A heat machine melts the ice on a wing's leading edge—but the water runs back and freezes on the back edge before heat can be applied there. It takes little imagination to visualize similar difficulties that have been encountered in virtually every one of the many different operations which must be performed to service a flying boat between flights.

But this war, like preceding wars, has demonstrated that men can stand a great deal more than ordinarily appears possible. The PATSU crew kept on working and fighting the cold: the planes kept on flying and fighting the Japs.

Corresponding to the PATSU's which service patrol planes are the CASU's (Carrier Aircraft Service Units) and the MAG's (Marine Air Groups). All three are shore-based units formed to provide competent ground crews that may be sent anywhere in the world to keep the Navy's planes in operation. Self-sufficient outfits, they carry their tools and equipment with them and are prepared to set up shop on the blazing beach of a tiny Pacific islet, on a frozen wasteland in the Arctic, or along the dusty fringes of Africa or the Far East.

The service units are a development evolved by this war through its all-important emphasis on air supremacy. In peacetime, the servicing and maintenance of aircraft fell to the officers and men who flew them, and to each squadron's own non-flying personnel. If a squadron based on an aircraft carrier left the ship for a tour of duty ashore, it took maintenance crews along. But after the war started, it became apparent that fighting the enemy was a full-time job and that the pilots and flight crews couldn't operate all day and perform maintenance and administrative functions at night. And any planes a carrier sent ashore were promptly replaced by other planes, so that there was no lessening of work to be done aboard the ship and the carrier maintenance crews had to be kept there. Obviously it was necessary to organize new, special units to take care of maintenance problems and free the flight crews for combat and patrol duties. For one thing, the work had increased not only in volume but also in complexity, with new-type planes, more powerful engines, and such things as hydraulic systems, .50-caliber guns rockets, and electric propellers—all requiring specialists to service them. Paper work also mounted as the Naval aviation branch expanded tremendously, and supply lines were stretched thousands of miles.

It is paper work with a purpose, however. It may consist of a report that a large number of failures are being experienced with some particular part. Photographs of the failed part, or of any temporary repairs that have been made, or sketches of recommended repairs form part of this paper work. The failed parts themselves may be shipped to supply depots where experts analyze them, study the reports, and take remedial action. If necessary, copies of the reports are sent to manufacturers. Information and instruction are given to all activities concerned with the part. Necessary paper work indeed.

A CASU normally has a complement of about 550 officers and men, but the figure may vary widely according to needs. Scores of CASU's operate overseas and in the continental United States. Some of the largest and busiest are at Quonset Point, Seattle, Alameda, Norfolk, San Diego and Hawaii. They are always shore-based, and are always prepared to move on short notice.

Service units sent to advance bases may be called upon, in addition to their regular duties of servicing and repairing planes, to build huts, pipe in water, dig latrines, and do various other jobs relating to housing and feeding themselves and the flying personnel. One group of mechs had to turn to road building when a plane overshot a runway and came to rest in soggy ground through which it could not be towed back to the field. Trucks backed along the new road to dump the road-building material at the end as the road was extended gradually from the edge of the field to the damaged plane, which eventually was towed back over the firm strip thus provided. Once back at the base, it was quickly repaired and put back into service.

While the service units which are maintained at the big bases have cranes that can pick up the biggest airplanes—as well as excellent machine shops and other facilities that enable them to handle any kind of a job—those in forward areas naturally do not have such extensive installations. Nor do they have plentiful stocks of new parts. They have to do a lot of improvis-

Deck crewmen on a carrier push a Dauntless into position for take-off. They wear vari-colored helmets to indicate specific jobs.

ing, perhaps making a hammer, a screwdriver and a piece of wire suffice for a job that in a civilian machine shop in the States would call for special tools and new parts. Wrecked airplanes which are beyond repair are stripped of instruments and parts that might come in handy for patching other planes. In their desperate desire to keep their planes flying, service unit crews are sometimes a little careless about whose planes they strip. There was, for example, a CASU on Bougainville which was in urgent need of a voltage regulator. When a Marine plane crashed nearby, a Marine group arrived fairly promptly to salvage any usable parts—but not quite promptly enough. The voltage regulator on the wrecked craft had been swiped before the machine stopped shaking. For once the triumphant sailors had got there ahead of the Marines.

Despite limited facilities, service units in forward areas often perform remarkable repair jobs—but there are limits. Ordinarily, material which cannot be repaired or longer maintained is sent back to an overhaul base. A bullet hole in a propeller blade is something that can be handled at an advance base. But if a propeller has become unbalanced by having had the whole end of a blade shot off, it is sent back to an overhaul base in the combat area, one not quite so close to the enemy's lines. If it is so badly damaged that special equipment is needed to repair it, it is sent farther back to an assembly and repair shop. If it is too badly mangled for even an A. & R. to do anything with it, a final step might be to ship the whole thing back to the manufacturer for salvage.

Even when air transportation is used, it often takes a long time for service units to obtain something ordered from the States. When one considers that a modern warplane engine assembly may have 25,000 to 30,000 parts, it is apparent that equipment and replacement requisitions present a big problem To cope with this difficulty, the Navy established an aircraft engine, instrument and propeller overhaul base at Noumea, New Caledonia. Work on it was started in May, 1943, when 11 officers and 20 men landed with 2,500 tons of material. In mid-June another ship arrived with shop equipment and 200 men. A third ship came in July, bringing 600 more men, extra clothing, stocks for a ship's service store, food, and other equipment. The shops were in operation in August, powered by Diesel generators and, by November, they were overhauling after 500 hours of operation.

One thing that caused trouble at Noumea was a lack of sand for sandblasting. It finally was obtained from an Army Air Forces depot across the bay and 20 miles back in the hills. In exchange for it, the Navy worked on Army *Liberator* engines.

Amid all the trials and tribulations of getting what was needed, the crew at Noumea was amused at the way one of its requisitions was filled. It had asked for 3,300 pounds of ice cream mix to supply 1,000 men for nine months. Somewhere along the line, apparently, someone had struck a typewriter key once too often, for when the mix arrived there was 33,000 pounds of it—enough to keep 1,000 men eating ice cream for seven and a half years. But it was all right—the Navy base kept its freezers going full blast and sold ice cream at cost to the Army, Marines and New Zealanders, thereby improving the morale of all hands.

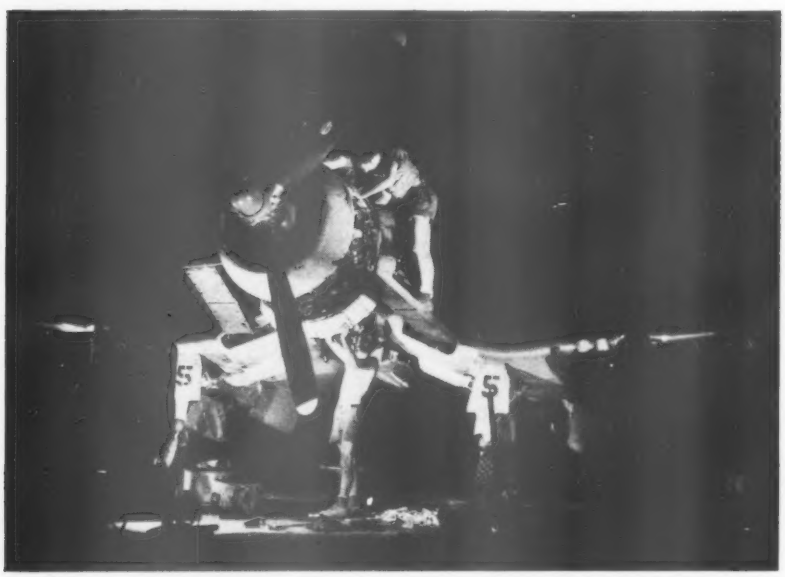
Ingenious men of service units in forward areas constantly are devising means of making their work more efficient, and taking steps to protect their equipment and materials. A unit at a Pacific outpost found it was taking too long to clean and oil the planes' guns after each flight because the ordnance shop necessarily was some distance from the line. The men, therefore, equipped a rubber-tired trailer —of the type used to take bombs and torpedoes to the planes—as a portable ordnance shop. They fitted it out with a tool box, a gun-cleaning pan, rags, cleaning solution, oil, a fire extinguisher. Now they wheel the shop to the planes. The guns are inspected, cleaned and oiled, and any necessary adjustments are made in much less time than formerly was required. The same crew constructed a hybrid-type ammunition hut with boarded sides and a Marine tent for a roof. Tropical sunshine makes rubber tires deteriorate quickly and rainwater is no preservative of metal; so they used tarpaulins to rig a shelter for their bomb trailers and bombs, surrounding it with an eight-foot wall of earth to absorb bomb fragments in case any Jap raiders came over.

Next to the officer in charge, perhaps the most important person in a successful service unit is the engineering officer. He must be a resourceful individual who knows airplanes inside and out, knows how to patch and improvise and how to inspire his men to work long hours under adverse conditions. In the Aleutians his men must fight cold along with other difficulties; in the tropics, they must withstand heat. But there the men can sleep under a plane's wing or wherever they happen to fall. Sometimes, when there is a pressing need to get the planes ready for an early strike, there is no sleeping at all and the men work all night by the light of jeep headlights.

Usually each plane has its own ground crew, consisting of a plane captain and his helpers. In addition to the members of the plane crew, who take pride in the craft's accomplishments and paint on Jap flags or other decorations denoting victories, there are general crews to service all planes equally. These include metalsmiths, engine experts, and the ordnancemen who wheel out and attach bombs or torpedoes. A line chief is in charge to whom the pilots report any special work needed.

The work of the service units never ends. The crewmen watch with unconcealed pride the departure of their plane. Hours later they are on the line as a welcoming party to "sweat it in." Its landing is the signal for beginning another arduous job. The exterior must be washed for the removal of mud or dust or ice, according to the climate, and the flying boats that make sea landings must be rinsed with fresh water to rid them of corroding salt. Often there are cowling cracks to be repaired, shrapnel holes to be patched. The radio, hydraulic system, oil-strainer and countless other things must be checked. Windows need cleaning. Fuel tanks must be filled; lubricating oil and grease must be added. There are guns to be inspected, cleaned, oiled, and adjusted. Bombs, torpedoes, or depth charges—according to the type of plane—have to be made ready for attaching before the next take-off.

Others may get the glory and the headlines, but the "mechs," their bruised fingers daubed with merthiolate, are the boys who really "keep 'em flying." The public knows little about them, but from top to bottom of Naval aviation, those who know accord them the Navy's traditionally conservative highest words of praise. "Well done." END



While pilots sleep, ground crewmen overhaul a Corsair. Note catwalk from wing to cowl.

PROVEN

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Today Beechcrafts serve in all theaters of war and their ruggedness and ability to utilize small landing fields combined with their high cruising speed have resulted in a demand by the Armed Forces for the maximum possible output of the Beech plants.

Before the war the same outstanding qualities caused the selection of Beechcrafts for such varied uses as the supply and administration of the Hudson's Bay Company's posts within the Arctic circle; missionary work in Borneo; exploration in Colombia; sheep-ranching in Australia; gold mining in Mexico and the Philippines; oil wildcatting in Texas; exploration in the Antarctic with Byrd; and dozens of other projects where efficiency and dependability are valued above all else.

* * *

When peace returns Beechcrafts again will be available not only to those who work at the outposts of civilization but also to everyone else that appreciates top quality and performance.

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BEECHCRAFTS ARE DOING THEIR PART

WICHITA, KANSAS, U.S.A.

Navigation

(*Continued from page 160*)

The aviator has no such leeway. He either hits it square on, or he misses completely. If he misses, the chances are very strong that he will lose his plane and possibly his life and the lives of his crew. Taking off from the deck of a cruising carrier in midocean and later, after hours of patroling, landing back on the same carrier that is in another part of the ocean, requires nothing less than expert navigation. There is no time for double checking the dead reckoning compilations, nor is there an older and more experienced hand to take over. Limited fuel will prevent him from "cruising around until something shows up"—and a carrier-based airplane will not remain afloat long. The pilot simply *must* navigate his way back to the carrier.

Early in the war there began to grow in the flight division of the Office of the Chief of Naval Operations a file of statistics on mission failures and Navy planes and crews lost through faulty navigation. In one of the Navy's navigation schools there was displayed a large poster which read: "The most common cause of error in navigation is the lack of experience."

Many pilots in the early part of the war had to gain this experience by flying over the ocean with their lives depending upon their ability to find their way back. Aviation training soon supplemented this rugged requirement with synthetic experience for the navigators. In co-operation with the manufacturers of the Link Trainers and the Army's training command, the Special Devices Division of the Bureau of Aeronautics adapted the Link Trainer for practice in navigation. The adaptation included the erection of a planetarium, machines for simulating weather conditions, and other attachments which made a flight in the trainer as nearly similar as possible to actual flying. It is said to be the most effective single training device in use. Not only do student pilots practice their navigation in these trainers but veteran pilots take extensive refresher work in them. The division also produced many other improvements and refinements in navigation aids and many similar devices for training aids. Among them are the graphic presentation of the celestial triangle solution, a wind-drift measuring device, vectograph equipment for screening three dimensional drawings, and many others both simple and complex.

The most sensational examples of navigation are the bad ones. One wrecked airplane and lost crew attracts more attention than 1,000 flights in which the navigators hit the destination squarely on the nose. The navigator may wrestle through storms, zero visibility and varying high-speed winds, but if the plane arrives within a reasonably close time to its expected time of arrival there is seldom more than the official interest in the story. Yet, a great number of successful flights have been made under harrowing weather and succeeded only because the navigator did an exceptional job.

One example of what the Navy calls "4.0 navigation" was reported recently from the hurricane incubator area in the Caribbean. Twelve *Venturas* (PV-1's) took off from the coast of Brazil before dawn. They went up 9,000 feet "over an overcast varying from scattered to complete," according to the wording of the report. They flew for 1,249 miles above the overcast, maintaining visual contact with each other. Positions were given from the lead plane every 30 minutes and fuel consumption was checked. Contact with base by radio was established every two hours. All navigation was by celestial methods. The destination was tiny Ascension Island in the middle of the South Atlantic. The results: Error in time of arrival from calculated expected time of arrival was 30 seconds; the deflection error was two miles. Any experienced navigator, whether in the air or on the water, will testify that that was plenty good navigating.

On another occasion, a squadron was ordered to fly to England from a port in the United States. The route was to be via Labrador. Two days before the flight the squadron took the journey synthetically in celestial navigation trainers. Actual weather conditions were "fed into the controls," time on the trainers was synchronized with that of the expected flight, three different weather fronts were encountered and the mock flight required 19 hours. Two days later the squadron, in actual flight, made the journey under practically the same conditions and arrived at its destination without mishap.

When navigation is bad, it always is a different story. On a carrier-based plane it usually results in the loss of the plane. On either sea or land-based plane it results in the defeat of the mission. One such example of poor navigation resulted in a going-over of the entire system of navigation training. Early in the war, a group of high-ranking Navy and Army officers embarked from New York for a conference in Bermuda. The flight, normally, should have required 4½ hours. After their expected time of flight had elapsed, the pilot searched unsuccessfully for Bermuda for another three hours, and eventually flew back to New York. Bad navigation had defeated the mission, but it had done more. It had given several top-ranking admirals and generals more than an academic interest in navigation. They knew what happened and they wanted to know why.

One of the major factors in the new method of teaching navigation is the series of texts, "Air Navigation," published under the supervision of the Training Division of the Bureau of Aeronautics. These seven manuals were prepared "for the purpose of orienting Naval aviation cadets to navigation that may encircle the seven seas." Written in a breezy style and illustrated by cartoons instead of the conventional geometric drawings, they are designed, according to the cadets, "to take the itch out of Bowditch." Those who have waded through the exact but humorless work of the great Yankee navigator of more than a century ago insist that they know more about navigation than can possibly be gleaned from the more flippant modern texts. On the other hand, the wartime-trained Naval aviator knows enough to "get there and back," a highly essential bit of navigational knowledge.

All Naval aviators are trained navigators. On the multi-engined land-based transport and search planes, usually in addition to the pilot and co-pilot, a third Naval aviator is the navigation officer. However, when the need for pilots began to draw these navigation officers back to the cockpit, a group of non-flying reserve officers was given an intensive course in navigation at a special school established in Hollywood, Fla. These reserve officers now navigate many of the big search planes.

Although present navigational methods are the most accurate that have been devised in the practical sense, the instruments used for obtaining the necessary data can be improved. The octants and sextants require a bubble to establish a horizon and this bubble is affected by the movement of the plane, giving accurate indications only when all movement is zero. This fact necessitates the use of a device to approximate the average of all of the altitudes measured through an interval of time. In rough air it is virtually impossible to obtain an accurate average.

For determining air speed there is the pitot-static tube which has to be corrected both for altitude and for temperature. Navigators should have an instrument that will give them their speed over the ground without any visual reference to it. Such an instrument would make the problem of wind determination above an overcast one of the minor matters of aircraft navigation.

In spite of errors, mishaps and poor instruments, some unbelievably accurate navigation has been performed on patrols at sea. In one squadron the navigators gambled on coming within one-half mile of a certain lighthouse 300 or 400 miles distant and did it—not once, but several times. A normal error for that group was approximately four minutes in its estimated time of arrival and two miles in deflection—after being out of sight of land for 12 hours.

In West Africa, two ports, about 100 miles apart, look very much alike. One is Port Lyautey, the other Larache (El Araish). Lyautey is in French territory and Larache is Spanish. At night the two fields are not distinguishable from one another and the control tower in the Spanish zone responds in much the same manner as the one in French territory. One night a pilot who didn't go much for navigation returned to the airfield, got an okay to come in and, as he circled the field for landing, met a blast of gunfire. He was attempting to land on the Spanish field. He got out safely and quickly developed a keen interest in navigation.

A fighter pilot, questioned concerning the navigational methods used in the speedy fighter planes, put it this way:

"We use dead reckoning. You know, I reckon I'll get back or I reckon I'll be dead."

END

In 1/50 of a second it stops stock-still

WHEN a plane pilot presses the button to adjust control flaps, he wants just so much motion and no more.

But electric motors take time to stop. They overrun.

So while electric controls were desirable because they were less vulnerable and didn't freeze up, they had the disadvantage of overcontrolling.

What you see in the picture is the Lear solution. It is the Fastop Clutch.

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As with all aircraft equipment, this unit had to meet unusual and rigid requirements of space and weight. It had to have rare power for its size. In fact the requirements were so severe, old-timers said it couldn't be done.

There will be many new conveniences and devices in the coming days of peace. Perhaps you are already planning one.

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Aerology

(*Continued from page 125*)

other planes. Fitted together, this information should piece out the jigsaw weather puzzle that had been scattered by the approaching storm. Another *Catalina* two search sectors away reported the time and place the plane first encountered precipitation, and two pilots in other sectors had done the same. Commander Tatom already had his own position and time plot on his chart. Making allowances for the time differences of the reports, it was now easy to draw a chart line representing several miles—a good approximation of the leading edge of the bad weather.

What the weather was, where it was and where it was going, no longer remained a mystery.

From the chart, the flying aerologist concluded that the storm was about 150 miles from Adak and moving at a speed of five to 30 knots. It could be expected to reach the base about 1400 (2 p.m.) that day. The radioman prepared the message and put it on the air to base operations.

A few minutes later all planes were ordered to return to base prior to 1330 (1:30 p.m.).

The pilot made a wide turn and headed for home. The weather gradually became more endurable. As they sighted the dim outline of Adak a few miles away, however, the placid appearance of the sea was gone. Increasing winds and a high overcast were moving in on the base.

The "crystal ball" had scored again. In fact, it has scored so frequently in the Aleutians—and on all other sea frontiers—that the Navy aerologists have emerged as a group of wizards—with a startling record of skill and accuracy. Theirs is a highly-specialized science, vitally important to all phases of sea and air combat.

The weather has been our ally many times in this war. The zero hour for ship movements for our occupation of Amchitka was set after the Navy aerologist promised "favorable invasion weather." It worked out with complete success. In this case the landing was made during a perfectly calm sea in the early morning. The Japanese had their base 75 miles away—but before they could launch a counter offensive a terrific gale was blowing. It blew for several days, keeping them grounded, allowing time for the consolidation of our positions. When it let up, our fighter strip was finished and we gained air control quickly.

We used the weather again at Kiska in the initial bombardment and landing. Our task force emerged from a thick fog bank under the very guns of the enemy, as had been planned. We opened fire. The Japs, completely surprised, replied with a heavy antiaircraft barrage at an empty sky. It was several minutes before the confused enemy finally saw the orange and red flashes against the grey fog bank and returned our fire. Although some of the ships had been out of the fog and in plain view for over 10 minutes before the bombardment, the protective coloration of the horizon prevented detection. The forecast for the Kiska landings, made by Lieut. Comdr. (now Comdr.) W. R. Franklin, was a masterpiece of detail, involving radical differences of weather conditions within a small area.

As planned, we landed on Attu in a heavy fog. The Japs were only four hours away, at Paramushiro, and able and willing to put up tough air opposition. Weather did not permit. The elements have worked favorably for us many times—the Marshalls, Gilberts, Solomons, Truk, and others. But they are not an entirely reliable ally; they can work for the enemy, too. However, the fact that most of our fights in the Pacific have been staged in weather favorable to the United States is evidence that our Fleet aerologists have been on the job.

Today they are flying out continually to meet the weather and prepare for it. As a result, the Navy seldom has losses from bad weather. Storms, of course, have long been the bugaboo of all Navies and they are hard for scientists to study, the trouble being basic—the scientist usually gets b l o w n out of his laboratory. Such a great authority was Dr. Isaac M. Kline of the United States Weather Bureau.

Dr. Kline was no seaman but a trained meteorologist, and he spent 48 hours riding on the side wall of a wrecked house through one of the worst hurricanes on record, in Galveston, Tex., in 1900. Dr. Kline was the local weather observer. In some manner he contrived to have with him a compass, a barometer, and one or two other instruments. While the wind howled and the sea churned, the young scientist rode about the city's streets and the bay, calmly making his measurements. As a result, many of the then-existing hurricane theories were altered. Dr. Kline subsequently received high honors from the scientific societies of the world. A tragic sidelight to his hurricane experiment was his discovery, after the waters had subsided, that his wife had been drowned and his own home blown away.

Much has been added to the knowledge of hurricanes since Dr. Kline's famous Odyssey. Improvements in communications and increased weather observations have pretty well enabled aerologists to locate, track, and predict the path of any disturbance, particularly in peacetime. Shore stations and ships at sea telegraph or radio to a central station local information gathered by expert weather observers. This information is now processed with amazing rapidity and appropriate warnings are sent.

With the war, however, one important source of this information is lacking. Ships at sea are generally required to observe strict silence. Subtract all the information they normally supply and there is quite a vacuum in the available meteorological data. In spite of this, advances in the past few years have made weather forecasting much easier.

For example, more than a decade ago Navy men started the lonely trek to the barren Aleutian chain where they stayed through the dismal fogs of summer and the icy gales of winter. Sometimes they were at sea, sometimes they sat on lonely Attu, Kiska, Amchitka, Adak, Atka, Kanaga and Unalaska, and always they were observing, studying, and writing about the weather. Such men as "Red" Lockhart, Howard Hutchinson, Ross Kellerman, "Bi" Byerley, "Marty" Burns, George Stone, and many others, who were members of various U.S. Navy Aerological Survey expeditions, all had a hand in getting us prepared for the day when aerology would be a matter of life or death.

The facts accumulated slowly. The Navy's library grew with reports of expeditions, papers by observers, thumb rules and practical facts. Among other things, Comdr. W. M. Lockhart, (now Capt.) of the Navy published his "Practical Aids in Weather Map Analysis," which is an excellent guide for determining the more frequently recurring types of weather. An extensive survey was made of the Alaskan Peninsula and the Aleutian Chain. Weather observatories were established and men sent to run them. All this, of course, as an addition to the vast material sent in from ships.

When the Japs struck, the ships went on radio silence. The necessity then arose for more extensive patrols by aircraft and more reliable reports. How the areological section of Fleet Air Wing Four, the famed *Catalina* outfit commanded by Capt. L. E. Gehres, (now Commodore) tackled and solved the problem offers a detailed example of the Navy's outpost weathermen at war.

Making a fair estimate of what the weather would be on any day in the Aleutians was simple—it usually was violent. Fairly accurate forecasts as to movement could be made but the lack of reports often made it impossible to tell the precise location of a storm center. Nevertheless it had to be found.

The Navy's policy of "Do the best you can with what you have," which has produced many miracles in the past, had to be the answer. It was decided that the Wing's aerologists w o u l d "fly the weather" as members of combat plane crews in order to get the necessary information. This was something entirely new, either in peace or war. All hands were trained as aircraft gunners. After checking out as experts in the gunnery course, the aerologists were issued flight orders. They were fighting, flying weathermen—a far-cry from the pre-war version of forecasters.

The names of the crew—Olsen, Smith, White, Carey, Roberts, Carter, Livingston, Herold, and Carrigan—will be gratefully remembered in aerological circles. Typical of this ingenious company perhaps, was Paul Carrigan, of Little Falls, N.J., who was known to his shipmates as the "Black Irishman." After December 7, 1941, he laid aside his civilian occupation and eventually wound up in the Fleet Air Wing Four as an aerographer's mate. He was at sea with the North Pacific Force for the initial bombardment of

(*Continued on page 198*)

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(*Continued from page 194*)

Kiska. When Adak was occupied he was the first official weather observer on the island. Alone he sent reports, entered weather data on the maps, and flew to gather more information as it was needed. In fact, he played an important part in the campaign. With other aerographer's mates who came in later, he had set up an impressive weather shop long before the firing ceased.

Others had similar duties. Some were shot at, bombed, strafed, torpedoed, or depth-charged. When the rapidly shifting war developed new fields of operation, members of this team were always among the first to go.

The proper use of weather has taken tremendous significance in modern sea warfare. A thick protective sky cover is invaluable for many types of missions, as it offers complete tactical surprise for both air and surface craft. A heavy cloud bank, concealing a squadron of *Avengers* until the pilots choose to dive through and unload their destruction, is a favorite condition. But to use this new weapon to the fullest extent every weather detail must be known. The aerologist is a key man in planning any operation. His diagnosis is one of the controlling factors in shaping every action.

In planning a bombing raid, for instance, the aerologist's briefing is particularly important. What he has to say will indicate the proper time for take-off, the amount and kind of bomb load, the distance that can be covered as a result of wind currents, and the proper rendezvous. A task force commander is interested chiefly in having thick weather, which will give maximum concealment for approach and retirement, but clear enough for operations at the target. To furnish this favorable type of weather the aerologist must consider the weather conditions, and probable weather conditions, over 2,000 or 3,000 miles of sea.

The approximate forecasting with a few hours error one way or the other that was enjoyed in days gone by is now out of the question. Such forecasts which would result in needlessly recalling planes to carriers or bases an hour or two ahead of an expected storm, for example, might mean that 100,000 square miles of ocean would go unpatrolled that day. Of course, not recalling the planes in time would be an entirely different story—resulting in a waste of good pilots and airplanes.

To prevent such occurrences, a tropical hurricane was studied recently at what might be called zero range by a Naval aerographer and his pilot whose motive was solely scientific curiosity. What they learned during their ride in the squall-whipped plane was described officially as "valuable data on tropical disturbances." The pilot was Ens. J. A. "Smokey Joe" Moulton, USNR, of Port Wentworth, Ga., and the aerographer was W/O Frank A. Magill, USN, of Miami, Fla.

The hurricane grew up in that incubator of tropical storms—the Caribbean. It was whirling in its eastern semicircle at 75 m.p.h. or more. The United States Weather Bureau meteorologist at San Juan, P. R., called it a hurricane, but that was all the specific information the weathermen could provide. Exactly where it was, what direction it was traveling, how fast it was moving and what its wind velocity amounted to could hardly be more than a guess.

Aerographer Magill had an urge to know all these things accurately. Planes from his squadron might be required to fly into the area on one of their long submarine patrols. Would it be safe? How far could they fly? How soon should they return to beat the storm? "Smokey Joe" Moulton blandly expressed the opinion that his Martin patrol bomber could take anything the average hurricane could offer, and in short time the proper orders were issued, directing him and Magill to fly a reconnaissance.

The weather bureau estimated that the storm was centered about 250 miles off San Juan, azimuth 350°. "When I had flown 250 miles in that direction," Ensign Moulton said later, "I was convinced that we had the right address. We began to jump and jitter all over the sky. It took everything we had to keep flying." He added that he had hoped to bear south of the storm center and if it proved to be of small diameter and weather conditions were not too bad, to circle the center counter-clockwise with the wind. As it turned out, this was impossible due to low ceiling and extreme turbulence.

Observations were taken from the time of the take-off (5 a.m.) and were continued for five hours. Frequent squalls were encountered within 150 miles of the storm center. Fifty miles nearer, the wind was reckoned to be 35 knots at 550 feet altitude.

"The swells," said Magill, "were the most tangible evidence of a tropical disturbance in the vicinity, notwithstanding the wind and weather conditions." In the future this fact might be noted by pilots and many storms avoided. The swells seemed to be coming from the storm center.

Moulton and Magill continued to hammer headlong toward the storm until 8:10 a.m. when a solid wall of cloud was encountered. This wall extended upward from the surface of the sea. "It undoubtedly marked the center of the storm," Magill reported. "The clouds were low and ugly, with heavy roll clouds at 600 feet altitude. These roll clouds were probably what has been termed the 'bar of the storm.'"

The turbulence was severe, they noted, and the ceiling was only 300 feet. At this point they decided not to fly completely around the area, but to remain in its western periphery. Maximum wind, estimated by taking drift sights, was 55 knots.

"Inasmuch as we were in the western semicircle," said Moulton, "or the so-called 'navigable area,' we believed that winds of full hurricane force—75 m.p.h. or better—existed over a relatively small area in the eastern semicircle."

Other observations led the aerographer to conclude that this particular hurricane was not perfectly symmetrical, as hurricanes are supposed to be, but was elliptical with the north-south axis. Because the storm was "incipient," not all the characteristics generally conceded to tropical hurricanes were noted, particularly as to cloud forms.

"I don't know how much more the *Mariner* could have taken," said Ensign Moulton. "I, for one, had had about all I wanted."

All in all, the experiment was exceedingly worthwhile. It provided pilots and seamen with several valuable guides to use in skirting bad storms and making accurate predictions.

It would be interesting, an aerologist has said, to issue a forecast and sit back and await verification. But it is much more practical these days to issue the forecast and then catch the first plane out for a preview. After the preview, necessary changes in the original forecast can be made. Such a system provides a fast, sure check on the weather whenever the sky is reluctant to give up all its secrets.

For security reasons the Navy will not disclose the exact size of its aerological organization but does admit that it has grown "from a handful of officers and men to thousands of officers and men."

Secrecy also shrouds certain new methods and techniques developed during the war, since they might be useful to the enemy if he knew about them. However, there are a few new things that can be discussed. For example, the Navy now has an automatic weather-reporting device which can be planted in isolated spots. Without an operator, it sends valuable data by radio. It is known that the enemy has found some of these sets and that is the reason there is no longer a restriction on talking about them. Equally valueless to the enemy is the news that the Navy has established a world-spanning net of "Weather Centers," units which receive and digest weather reports and forward summaries and forecasts to all commands to which they may be useful.

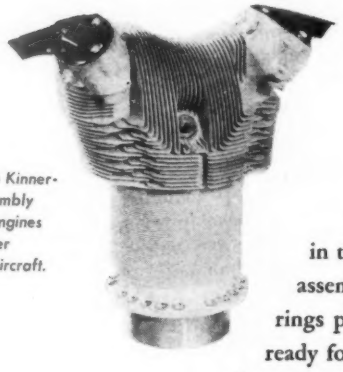
Weather reports from aircraft, made either by "weather flights" sent out specifically to collect aerological data or by routine patrols sending in such information as a matter of course, have increased greatly in importance during the war.

On the receiving end of weather broadcasts are aerological units now attached to virtually all fleet commands, task force commands, and aircraft carriers. They make their own observations too, for the direction and velocity of wind are important items for a ship's navigator and gunnery officer. When a ship's guns are firing at a target miles away, the direction and force of the wind—not only at the surface but also at the higher altitudes through which the shells will pass—must be taken into account in the gunnery officer's computations. The aerologist or aerographer's mate must be prepared to supply such figures on short notice.

Has the weather been more helpful to us or to the enemy? When a high-ranking Naval officer was asked this question he replied after due reflection that on the whole we had been more benefited than harmed by weather conditions—largely because we have been able to foresee what the weather would be at critical.

(*Continued on page 203*)

Engineering officers on isolated fields all over the world claim that ground crews work magic in keeping bombers and fighters on the line. The "magic" of keeping the big Wright 1200 hp. engines that power Flying Forts and other fighting aircraft revving at top rpm is made practical today because of Kinner-built cylinder and piston assemblies. Gone is the old studding assembly, with possible delays for spare parts, time consumed in building up the new unit, and long, slow, run-in after assembly in the airplane—all work that must be done in the dirt and dust of an advanced base. For, the Kinner assembly is precision-built—valves ground in, pistons and rings perfectly matched, run-in and dynamometer-tested, ready for combat duty as soon as it arrives at a far-flung base. Supplied under contract with the U.S. Government, the assemblies are a product of Kinner workmanship and production skill. KINNER MOTORS, INC., Glendale, Calif., U.S.A.



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✓ Control of War Emergency Power is also incorporated in these models.

PERFORMANCE:

✓ The carburetor inlet air pressure in a typical application is automatically held constant, at any altitude within the rated limits of the engine, by throttling the inlet to the auxiliary stage.

✓ The sensitive element, consisting of the air pressure and the evacuated bellows, measures the carburetor inlet air pressure and functions continuously to prevent that pressure from dropping or exceeding the setting. The auxiliary stage inlet throttling valve is adjusted by an oil actuated servo piston, regulated by a valve connected to the sensitive element.

✓ War Emergency Power is provided by a bellows which resets the Supercharger Regulator, during water injection, to a higher value. The regulator is automatically reset to normal when the supply of water is exhausted or when water injection is discontinued.

DESIGN FEATURES:

✓ Compact and light weight, weighs only 4.75 lbs.; regulators mount on engine accessory drive section.

✓ Low vulnerability and ease of installation provided by internal oil pressure and oil drain passages.

✓ Oil seals prevent leakage at servo piston shaft.

✓ Bellows assembly is submerged in oil, preventing damage from vibration and lubricating all operating mechanisms.

✓ Evacuated bellows provides constant pressure control regardless of atmospheric pressure or temperature variation.

✓ Compact, lightweight bellows assembly reduces acceleration loads.

✓ Balanced, oil control valve design provides accurate regulation regardless of oil pressure variations.

✓ All settings adjustable . . . covered and tie-wired to discourage tampering.

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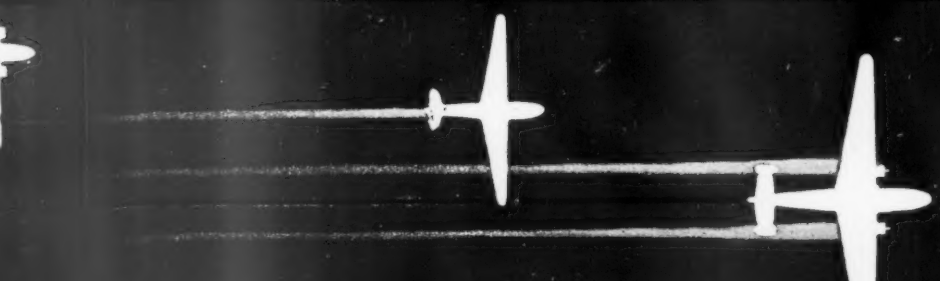

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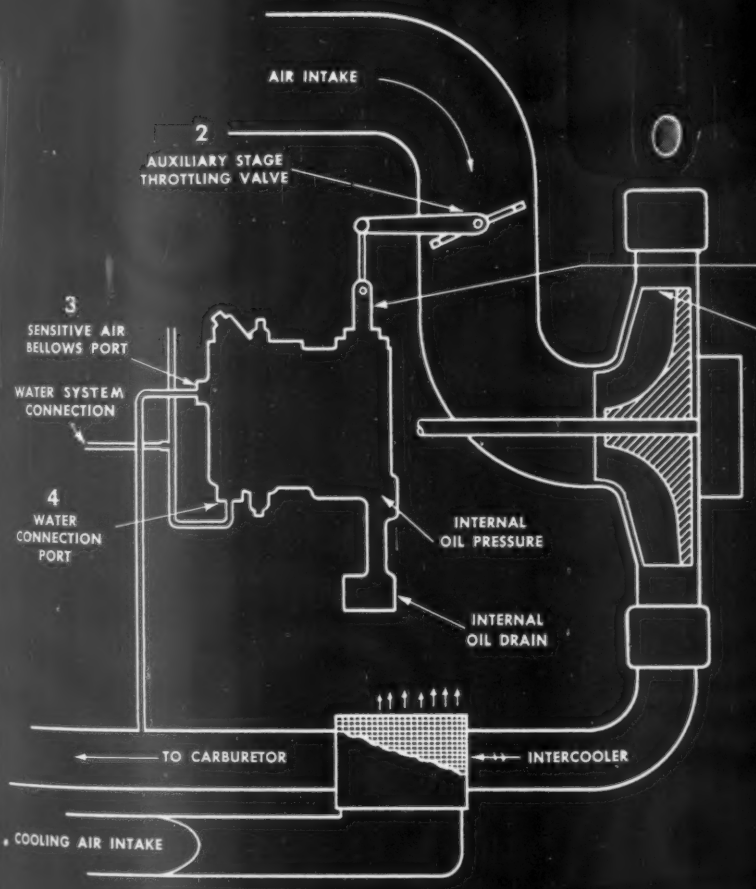

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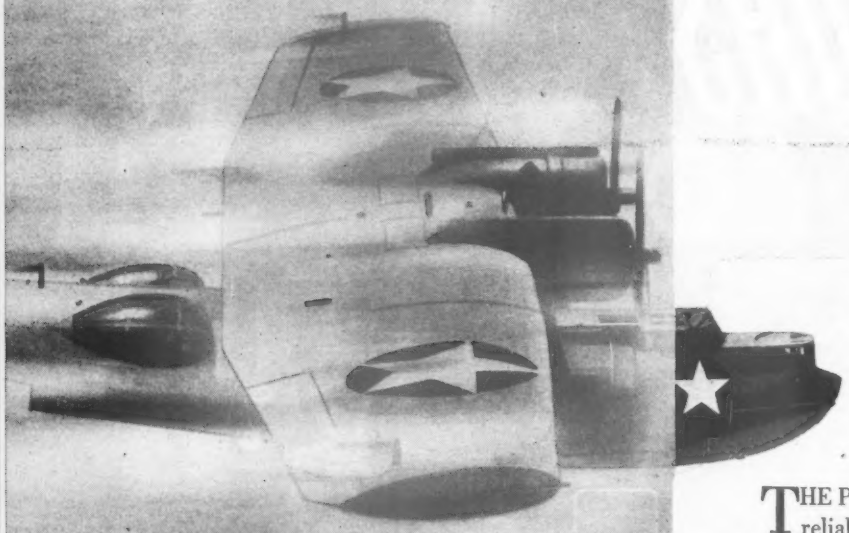
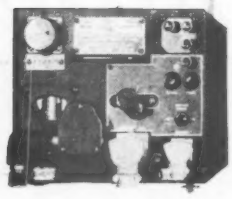


RCA Aviation Radio Transmitter used in the PBY Catalina



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The good engineering, the quality construction, that make RCA Aviation Radio reliable when life and the successful accomplishment of war objectives are at stake, will serve aircraft manufacturers, the air transport industry, and the American flying public equally well after the war.

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BUY MORE WAR BONDS

(*Continued from page* 198)

times. True, the Japs sneaked toward Pearl Harbor under a weather front and the Normandy invasion was handicapped by bad weather, but our successes in the Aleutians and in the Central, South, and Southwest Pacific landings and in the North African invasion were all accomplished under favorable weather conditions. It was not that fate was kind to us; we just had the correct weather information and timed our moves in accordance.

On the other hand, one of the greatest disasters suffered by the Japanese, the Bismarck Sea battle in which they lost all 22 ships en route to New Guinea to reinforce their garrisons there, may be attributed to the Japs' bad guessing about the weather. The ships had started on their mission under the protection of a good cloud cover, but the skies cleared and exposed them, first to discovery by our search planes and later to attack by our bombers.

If the aerologist is fortunate enough to be based where there are sufficient reporting stations, weather forecasting is somewhat easier. But if his unit is at sea, or working in strict radio silence, it is a difficult operation. A comparatively short flight can do much to fill in the holes on the weather map when information is limited. If the weather is bad, the aerologists fly with patrols to find the trouble spot. If the weather is good, they are assigned to search sectors where treacherous conditions may develop and become tomorrow's weather. Pilots are rapidly becoming another valuable source of information. Weather details they bring back from distant missions add to the picture. "Supply the aerologist with necessary facts and he will supply operations with necessary forecasts," has become a slogan.

There is no such thing as "freak" weather, Navy forecasters say. All weather can be logically explained and can be forecast accurately by competent weathermen if they have the reports. The same weather rules apply generally all over the world, it has been found. Matching local peculiarities against reports from other localities provides the weatherman with the basis for his forecast.

The reports from pilots have greatly stimulated this forecasting. When additional bases are gained the whole weather operation will be very well in hand. Those bases are rapidly being obtained as our task forces knife steadily through the Pacific. END

Advance Base

(*Continued from page* 134)

as much comfort as possible. Both officers and enlisted men live in Quonset huts, which are about 40 feet long and are formed from a semi-cylindrical piece of corrugated iron that curves up from the ground and back down again. The ends are screened and there are curtains to flap down during high winds and rain. Usually each hut will have 10 or so cots in it, although eight officers or men is the average number of residents per hut. Each man has a cot with a mattress, sheets, and a blue bedspread. The sheets are changeable once a week and everybody is sure to change them because dampness eats in quickly in the South Pacific and mold forms everywhere. The furniture of a hut includes two or three tables at which the men write letters and play cards.

Navy personnel start for work, except for pilots on special hops, at 7:30 a.m., and knock off at 11:30 a.m. for lunch and return at 1 p.m., then secure for the day at 4 p.m. When the pilots are flying, which is often, they generally are limited to four-hour hops. Very often, however, they are called upon to fly long hours. When the weather is particularly good, everybody gets in as much gunnery practice and other training as possible. Now and then, also, a real emergency arises. Recently the scouting squadron flew for several days trying to locate one of its group who had spun into the jungle while on a routine flight. Three men saw the plane head down in a 30° glide and disappear.

The jungle on Santa Maria is unbelievably dense. It is green and still and the vines are a tangled wildwood in which it is quite possible to get lost within 100 yards of the road. Cut directly into the interior of the island is a coral road built by Seabees. Along this highway, which is seldom used, the jungle keeps creeping in and has to be cut away periodically.

Searching parties for the missing plane worked into the jungle from several points along this road, cutting out paths with machetes. Dive bombers also tried to locate it, but with no success. The plane, with both pilot and rear seat man killed, was finally found several days later by native bushmen. It had been completely swallowed up by the vast waste of evergreen.

Shortly after 4 p.m. the men of Naval aviation come up from the squadron strips, hangars, and headquarters to their various Quonset Huts. First they take a shower and then ordinarily head for one of the several officers' clubs. Similar clubs are also available for enlisted men. Good beer, cold and plentiful, is generally on sale for 15 cents a bottle, and some of the clubs have other drinks as well. The men straggle in and sit around circular tables or along seats that line the walls. They drink beer slowly and talk over the day's flying. One of the clubs, organized by the first group of officers in the area, is a rather regal establishment. Membership costs $133 and was once limited to a handful of pilots. The original idea was luxury rather than exclusiveness. The club is run with strict attention to finances and it is now planned to cut down the membership fee to accommodate more of the now-greatly-expanded personnel. The club's outstanding article of furniture is a fancy bar that dispenses all sorts of mixed drinks. The members are allowed a limited number of chits each week so that liquor consumption is regulated, although this is really unnecessary. There are several comfortable chairs and couches and a lot of particularly striking pin-up pictures. The commanding officer of one of the airfields is head of the club. The atmosphere of this gathering place is quiet and genteel. It is a great favorite with the New Zealand pilots.

Money is not much thought of on Santa Maria. There is little except beer and clothing from the small stores and souvenirs to spend it on; as a rule, everybody has more money than he can spend. A great many of the enlisted men send a lot of their money home. On one ship based at the island the bi-weekly payroll of the enlisted men was $1,300. Of this amount, the officers estimated, an average of $1,200 was sent home each payday. In the early days of our occupancy, a good knife often sold for $50 and fabulous prices have been paid for other articles. Poker games used to run around $250 in each pot. One of the favorite pastimes of Navy men on Santa Maria is collecting souvenirs to send back to their families. Among the items high on the list of desirables are grass skirts made by the natives, boar's teeth, rattan mats, tapa cloth, shells, cat's eyes (part of a snail's shell), native combs, unusual coral formations, and beads. One flight surgeon made a trip to an outlying island and burrowed into the headhunter country. He emerged (head intact) with a lot of wonderful souvenirs, including seven excellent specimens of the headhunter's art. A local trader who was friendly with the headhunters had several heads around and decided he could spare a few.

Many pilots who fly seaplanes make regular visits to the other islands, where there are several hospitable white families. The pilots go over for weekends and rest up. They also fly seaplanes on trips of exploration. One small island has a fresh-water lake high up in the mountains. The pilots like to fly there, land on the lake, and camp over the weekend. It is deserted, the duck hunting is wonderful, the fishing and swimming are fine, and it is possible to take a sun bath without getting too hot. Since it is simple to land seaplanes on this lake, the flyers have built a camp there that will accommodate several dozen persons.

After dinner on Santa Maria the attention is split fairly even between the officers' clubs and the movies. There are numerous makeshift theaters on the island available to both enlisted men and officers. Some are roofed over in a rather primitive manner. Usually just as Gable is about to kiss Grable, or Raft is ready to knife Bogart, a sudden rain starts pouring down and a man's attention is likely to be diverted.

The development of these theaters is interesting. The first movies on Santa Maria (all of them are outdoors) consisted of a sheet strung up between two palm trees with some logs to sit on. A similar one at Funafuti was known among the customers as "Loew's Fun-

afuti." Gradually, seats were added to these open air establishments, the screens were improved, and the sound and pictures got better.

As a rule it rains about seven times during any given performance. When this happens in an unroofed theater, the men stoically get out their ponchos or raincoats and continue to watch the movie. The operator, of course, is housed and nobody seems to mind if the screen gets wet.

The precipitation in these islands deserves special mention. One officer on a special mission recently reported to his commanding officer: "Roughly two hours after we came here the rains came—the beginning of the wet season, and when I say wet I have not said anything. There is considerable variety to the rain here. For the most part it just plain pours, but it occasionally drizzles, steams, drips, mists, sprinkles, showers, cloudbursts, and deluges. Once in a while, also, the better part of the adjacent ocean rises up in the form of cloud and comes down quickly in the form of a fresh water lake. At the moment I am sitting in the head medical officer's hut and the rain outside is so lively I can just barely make out the outlines of the next hut, some 40 feet away. The fierceness of the downpour is literally so intense that coconuts are frequently loosed from their mooring and descend with hearty thuds on all hands (on all sides, I mean, not that the personnel don't get beaned now and then). It has been raining steadily all night and morning. It rained most of yesterday, and unless God or the aerologist takes a hand, it will likely rain all day tomorrow."

The Santa Maria movie audiences are fairly demonstrative. The sight of a low-cut gown is sure to evoke a rousing series of whistles, moans, groans, catcalls and other cheers. Villains are hissed at and nearly everything strikes the men as funny. The cinema commodity that is sure to make everybody uncomfortable is mawkish patriotism. Heroics are out; the picture makers, it has often been remarked, should learn this and steer the flagwavers elsewhere. A scene wherein the hero fixes his eye on Old Glory and climbs out a hospital window with two broken arms in order to rejoin his regiment is almost sure to result in a quick and rather general exodus.

Most of the movies are surprisingly recent, although it is true that nearly all vintages are shown at one time or another. Newsreels run considerably behind for some reason. A moderately recent one included the Notre Dame-Northwestern football game of last fall and the meeting between Mountbatten, Somerville and the Chiang Kai-sheks. Some of the films arrive in eight reels and since the operators are without the usual two projectors, things get rather choppy. The seven breaks in the continuity generally occur at the seven most interesting parts. This always results in loud and general groans. Preceding the start of the movies, which in most of the theaters is 7:30 p. m., the operator plays either records or especially prepared transcriptions by singing stars that are intended for military personnel in specific areas. The singer will talk between numbers and usually addresses the audience as "fighting men of the South Pacific." The audiences tolerate it.

A good deal of attention is given to recreation in the form of sports. There are skeet ranges, badminton courts, punching bags, horseshoes, and team sports like baseball and volleyball. Fishing is a great favorite and so is boar hunting up in the hills. Exercise is understandably most popular in the dry season. The climate of Santa Maria is enervating; unless the weather is particularly fine, interest in sports has a tendency to lag. Some of the enlisted men like to swim in the river which cuts through the island and empties into the harbor, but there is little swimming in the sea owing to a dangerous fungus and to the scarcity of good beaches. Santa Maria is encircled by a reef and the sea consequently does not wash in and form beaches.

Everything possible to maintain the general health is done by the medical officers. To begin with, they have organized highly effective disease control. Navy men eat good food. There is a good deal of canned meat which is fixed in a number of varied ways, often being disguised to the point where the diner never doubts that it is canned but is nevertheless delighted with the effort at deception. There is no fresh milk and there are few fresh eggs, but the powdered substitute is nutritious and tolerably palatable. Now and then fresh eggs come up from New Zealand. As milk is practically nonexistent pineapple or grapefruit or orange juice is drunk instead. Although coconuts are plentiful, the men seldom eat them or drink their milk. The prevailing notion is that coconuts act as a quick and violent physic.

Perhaps the chief diversion of Naval personnel on Santa Maria, both enlisted men and officers, is sleeping. Ordinarily when anybody has some time off he gets in the sack, to use the popular term. The men often take a nap at noon. Bedtime, unless something special is afoot, is around 9:30 p.m. Everybody rises at 6:30 a.m. or thereabouts. Breakfast is served from 6 to 8 a.m. and the day's work begins at 8 a.m. on the dot. There is no such thing as muster, nor is any great effort made to run a formal or "taut" camp. This seems much the wisest course, since everything appears to run smoothly under the casual system.

Uniform of the day, everywhere south and west of Pearl Harbor, is khakis with no necktie. Within sensible limits, the men pretty well wear what they please. Pant legs are often rolled up, pith helmets are permissible and the pilots nearly always wear baseball caps. The whole idea seems to be one of getting out the work and fighting the war with a minimum of nonsense.

The enlisted men and officers of Naval aviation are energetic about letter writing. The reason is doubtless that receiving mail is the biggest thing in their lives at the moment. As a result, they write letters constantly. The average officer will write two or three letters a day to wives, mothers, girls, and so on. They do a good deal of talking and dreaming about getting home, and the Navy tries to see that they are relieved after serving 12 months at an advance base.

At the moment, Santa Maria is the most luxurious of our advance bases. Farther north the bases are rougher—and, of course, in the earlier days of our occupancy things were very rough indeed. The following excerpt from a report written by Lieut. James E. McAshan gives some idea of early conditions in Guadalcanal:

"In February, the pilots who were flying our fighter planes lived in tents which had a dirt (often mud) floor, were fortunate to get two meals a day, and flew on the average of five or six hours a day in air that conservatively could be called hostile. They used a tent near the runway, also undecked, for a ready room, and a mess hall so improperly screened that dysentery was taken as an accepted part of living there. Communications with headquarters near Henderson Field were never good, and the lack of transportation often made this a very serious matter, for scramble orders originated there. In addition to these hardships, the Japs so often made our nights hideous with bombing raids, many of which were directed at our field, that getting enough rest was impossible. And, of course, now and then a pilot would be killed or badly hurt in a fight with the enemy or by operational accident, the latter made more frequent by the lack of sufficient spare parts.

"My squadron VMF-221, for which I served as intelligence officer, consisted originally of 26 pilots and in one hard action on April 7 it actually got 20 planes in the air, a truly remarkable record for a combat tour of duty already five weeks old. Our planes, *Wildcats*, were maintained by VSO-251, the chief mechanic of which was Marine Gunner Knight. He was able, by going to the scrap pile for spare parts and by truly heroic night work, to keep the planes flying, but I believe that he is the only man who ever actually built a plane under combat conditions. One of the 20 planes mentioned above was a complete child of nature and the skill of Gunner Knight. She was called The Bastard, she had no bureau number, and when she was finally lost she involved the most awful amount of red tape because the only way to identify the plane was by the appropriate but unmilitary name just mentioned.

"In spite of the hardships and lack of any sort of comfort, the pilots maintained an amazing level of cheerfulness. For example, one morning while several of us were in the ready tent, a plane returning from an early patrol landed without cutting off the gun switches. Unfortunately the guns aimed straight at us, and the resulting burst of fire made us all hit the dirt. No one was hurt but the mud soiled everything we had on. This error was excused by the squadron but the pilot, whose name was George Dawkins, was cautioned and not too mildly. The next morning, after we had put on clean clothes, the same thing happened with the same pilot. Red

(*Continued on page* 208)

● Even counting all the days—and nights—put into planning and preparation by designers, builders and suppliers, B-29 still represents a miracle in achievement—the number of days still seem far too few for the undertaking.

Built to carry loads beyond former limits, at speeds never before considered, and safeguarded as no fighting plane before it, the Super-Fortress history-maker represents a new high in co-ordination between those who plan and those who build.

Leaders among manufacturers—known for quality of products and ability to deliver on schedule the various types of equipment needed, were asked to pledge their co-operation in this twenty-four hour a day job. Amphenol is proud to have been chosen to furnish the electronic connectors and parts for this great weapon.

Engineers in these plants from coast to coast worked simultaneously in designing parts that would meet the requirements set. Each production department set up a time table of the dates on which it would make first and subsequent deliveries. And B-29 progressed by the clock.

The first take off was on schedule. Japan was bombed on schedule. And today, American flyers have a marvelous weapon which gives their talents full play.

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A POSTWAR PLAN
for G. I. Joe

A MESSAGE TO MOTHERS AND FATHERS OF SERVICEMEN

Returning servicemen and women have a ready-made postwar plan in the "G. I. Bill of Rights" which recently passed Congress. Among its many provisions are such awards to veterans of World War II as tuition for vocational training plus a government guarantee on loans to enter or purchase a business. It is a *guarantee* of *opportunity*.

Knowing that after the war aviation will provide opportunities which will even surpass those offered by the automotive and radio industries after the last war, your sons and daughters in the service will be exceedingly interested in studying the career opportunities in aviation. California Flyers' School of Aeronautics has a limited number of pre-Pearl Harbor catalogs which factually describe various divisions of aviation, the opportunities, the training, and educational background necessary. Although it is obsolete in minor respect, the book is one that every young person considering a career will want. *It's free. There is no obligation.*

California Flyers, which is one of the nation's leading aviation schools, will accept no enrollments or deposits at this time. This famous school has completed an intensive training program for the U. S. Army Air Corps and today is entirely engaged in an important aviation project. Till the war is won, California Flyers must say, *"Sorry, no enrollments accepted."* But in the meanwhile, brand new *postwar aviation courses* which will meet *postwar aviation problems* are being created, and they will be well worth waiting for!

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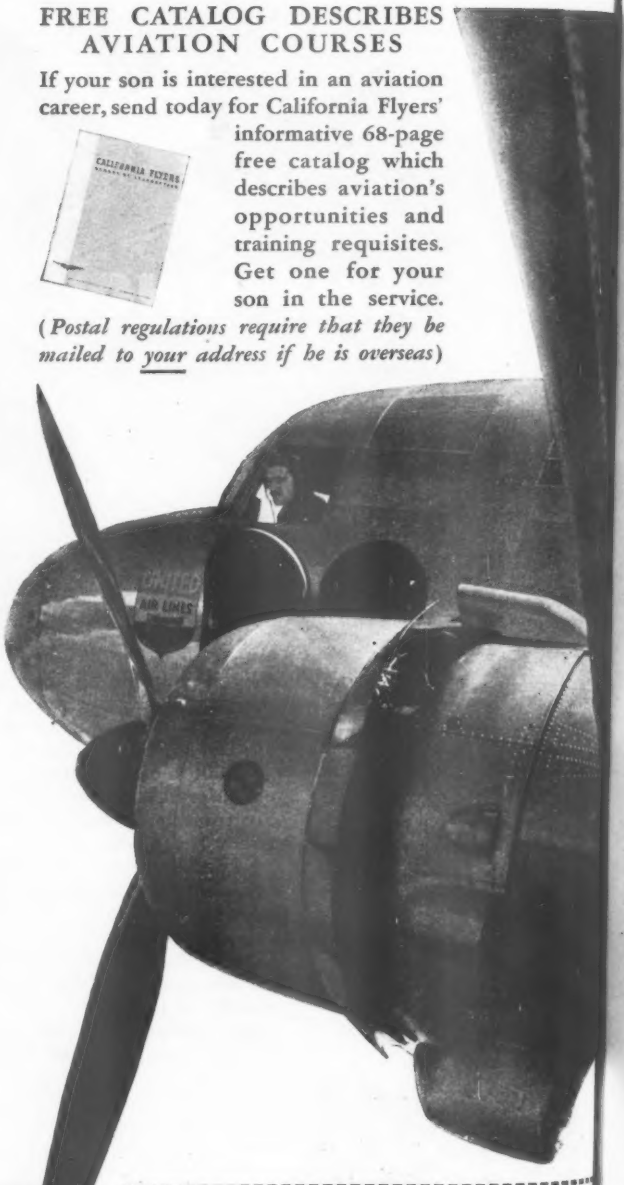

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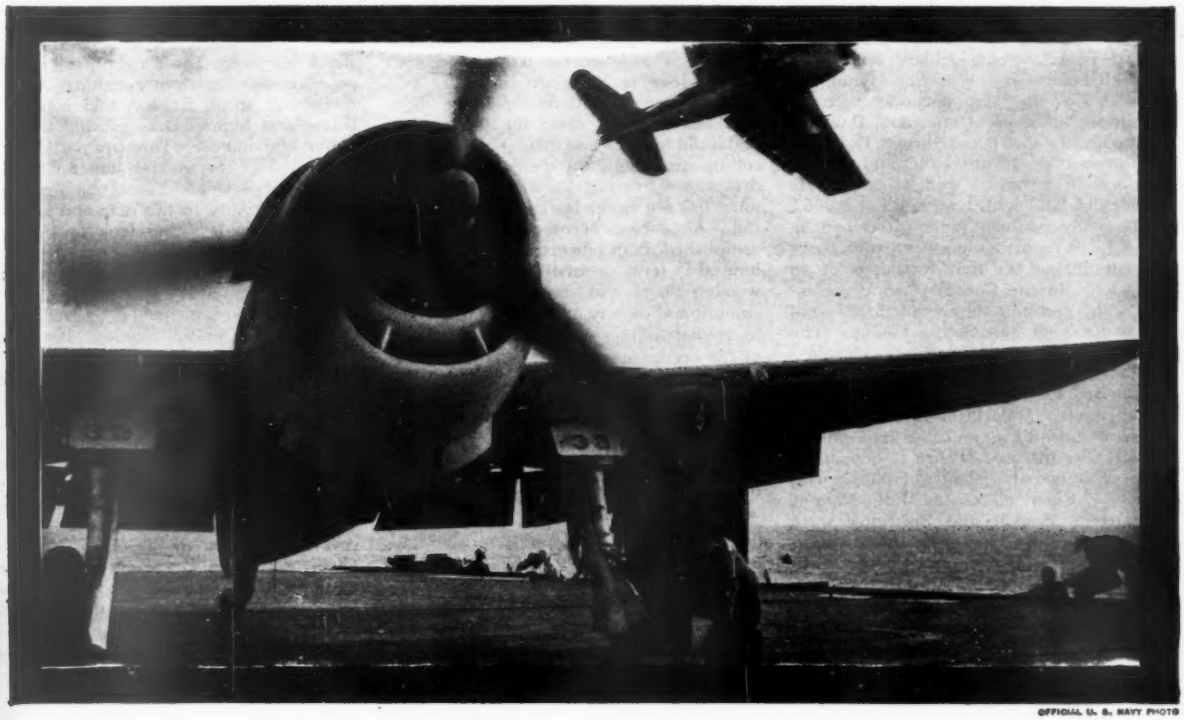

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Today, tires on the Navy's planes must carry greater fighting loads than ever before—and when the order comes, "Man your planes!"—there can be no room for question about the job those tires will do. The Navy takes no unnecessary chances. Through reports from combat zones and by constant tests in its engineering laboratories and in service, the Navy's experts keep constantly in touch with all performance problems—relay them on to all suppliers for immediate action. This is just another example of the never-ending vigilance and vision of the leaders of all our fighting forces in putting into practice their prime precept—"Never waste a life."

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DROP TESTED—At one of the test laboratories of the Navy Bureau of Aeronautics, landing wheels are "drop tested" on a rig like this. Here a set of landing wheel tires is mounted on the rig and dropped under full load simulating landing impact. The tail wheel is tested, too, on a similar testing rig

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DECK TESTED—Actual service tests carefully supervised by Navy engineers and often observed by the supplier's engineers show how the product stands up in service. On tests like this, U.S. Royal Airplane tires—and tires of all other suppliers—must prove their ability to "take it."

BATTLE TESTED—The toughest test of all is the battle test where all rules are off—and every airplane tire is "on its own". Lighter, stronger, U.S. Royal Airplane tires are facing that test and proving their strength on the Navy's planes around the world.

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(*Continued from page 204*)

Halsh, another pilot, got a .50-caliber bullet tied up in blue ribbon and when Dawkins came in, the Marine Hymn was played on the old portable victrola. While we all stood at attention, Dawkins was officially christened 'Strafer Dawkins' and presented with the bullet and with all our soiled clothes as well, to wash. He never did land with his guns hot again."

The adverse conditions described in McAshan's report no longer exist on bases except during the first few days of an invasion. In the Central Pacific the topography and climate are much different from those of the South Pacific. The islands are coral instead of volcanic—and seldom rise more than a few feet above sea level. Consequently there is little jungle. Malaria is unknown, there are few mosquitoes and flies and, on the whole, less disease. There is now great variety among the islands of the Central Pacific. Such places as Roi, Namur, Kwajelein, Engebi and Eniwetok were reduced to bare strips in the invasion shelling and bombardment. Covered with little but twisted palm stumps, they now offer but slight protection from the bright Pacific sun and have no vegetation to hold down the dust against the trade winds. In the Gilberts, only Betio of the Tarawa Atoll was badly smashed by our guns.

When a new island is captured, all hands sleep in the open or under pup tents and eat K rations for a few days. The Seabees first clear for the airstrip and build latrines and mess galleys. They set up distilling equipment for sufficient drinking water but for a while the men must use sea water for shaving and bathing. As a base becomes a little better established, both officers and men will be housed in tents about 16 feet square with wooden floors and screened sides. The amount and variety of furniture contained in these dwellings depends on the interest of the occupants. Nearly all the enlisted men like to name their tents. Also they like to build wind-powered washing machines to put in them, even if the island has a laundry, which most of our bases do. Persons with a particular antipathy to heat may cover the roofs of their tents with thatch, which will outlast even a metal roof by at least a year.

The natives on the islands taken in the Central Pacific are generally friendly, despite their long domination by the Japanese. Once free of the Japs the natives are quickly converted to decency. Missionaries, with the grudging sanction of the Japanese, have been in the Marshalls for years. As a result, the natives practice the Christian religion. A good many can speak English and also have Bibles and hymn books printed in their native Marshallese. They are particularly interested in the movies that are set up after a few weeks of our occupancy. They come up timidly to the rear and sides of the amphitheaters and look on silently. Nobody seems to know how they feel about it all, since they never change expression.

A curious coincidence recently occurred at one of the movies. It was, of all things, an aviation war film, and in the course of events a squadron of big planes started dropping bombs. Simultaneously the Japs appeared overhead and started dropping a few real ones. For a while the movie audience sat unperturbed, thinking the noise was all part of the picture. Then a bomb landed in a nearby grove and lifted all the seats several inches off the ground. The audience arose and departed for foxholes without delay. The natives, however, had left several minutes previously—the movie bombing had been quite enough for them. END

The Jap

(*Continued from page 117*)

the pilots on most island bases, in all probability, are to take fewer chances and to put up only a token show of resistance, but to delay and impede the Allied advance as much as possible without heavy losses. At Guadalcanal the Japs were savagely aggressive; they had the idea then that the war was practically won. But as their Guadalcanal campaign folded, they got rid of the notion that they were supermen. Before losing so many aircraft and surface ships as to become helpless, they went on the defensive. They are now fighting what has been described by high-ranking Allied officers as "an offensive war within a defensive frame." In other words, they are still making some offensive gestures while retreating slowly.

No doubt this has had much to do with the change in Jap pilots. It is not, however, the sole cause or even necessarily the greatest one. There is evidence that the best Jap pilots, particularly in the Navy, have been expended. Midway, for example, accounted for four Jap carriers, with most of their plane crews, and the battle of Santa Cruz Island put two more carriers out of commission and neutralized four air groups. For months after these battles there was a noticeable slump in the quality of Jap pilots. Last winter at Rabaul they improved considerably for awhile, leading our intelligence officers to believe that they had brought in most of their remaining carrier pilots, but the Rabaul fighting reached such proportions in January and February that the new imports were liquidated.

Most Jap pilots in the Solomons and New Britain were Navy; on the whole these are superior to the Jap Army pilots fighting in New Guinea. The Navy pilots are selected more carefully and get longer and more thorough training. In the Central Pacific the Jap pilots, both fighters and bombers, have shown the same inconsistency in performance and the same decline in merit. There is no question that the great majority of first-string Jap pilots—those who entered the war with the great advantage of experience in Chinese combat theatres and elsewhere—have now joined their ancestors. The ones carrying on the fight still provide strong opposition on occasion but no longer in the master race tradition.

The case history of a "typical" Jap pilot would run something as follows: He is a second class petty officer and has been educated through two years of high school. He can speak enough English to ask for chewing gum and inquire after the health of Judy Garland. Probably a native of Tokyo, he has a cultural finish roughly corresponding to that of a Dead End child in lower Manhattan. In 1940, at the age of 22, he responded to Hirohito's call for cannon fodder and entered a Navy ground school. After two years of the ground school, he attended a pilot school for a year, getting in 300 hours flying time. Following this was a year of operational training that was highly energetic; he flew about 5 consecutive hours a day, generally taking along a lunch hamper filled with rice and elderly fish. During his last year of training he worked in 240 hours of flying, which included qualification in instrument flying. After winding up his training he got ferry duty in Saipan and then he joined an air group assigned to repel our attacking force at Palau.

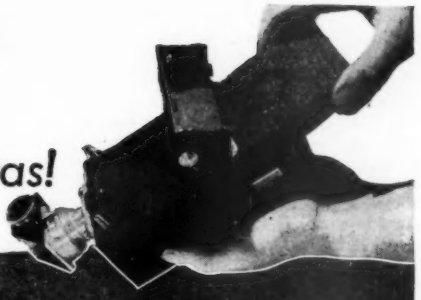
Ordinarily, obtaining information from Jap prisoners is virtually impossible. To begin with, they hold the belief that if captured they will be tortured, which has had the result of making them commit suicide now and then. One Jap at Bougainville, after making a half-hearted gesture, shooting at himself and missing, gave up and joined the enemies of civilization. His momentary reluctance to come over, he said, was due to a small misunderstanding. His intelligence officers had informed him that if he capitulated the Seabees would stake him in a field and run over him with a bulldozer.

The ratio of Jap officer pilots to enlisted pilots is about one to six. Captured Jap officers are much surlier than the enlisted men. They remain uncooperative, moody, peevish and tricky no matter how they are treated, whereas the enlisted men, after they have become adjusted to kindness, sometimes get playful and happy, like little children. Their mentality has often been compared with that of children, in fact. Physically, the Jap pilot is scrawny, weighing around 110 pounds and standing about 5 ft. 2 in. tall. Most Jap prisoners are in good health, although by and large they are distinctly unimpressive looking.

One of the big surprises about captured pilots is their sensational ignorance about war. Their leaders, it appears, have not brought them up-to-date. In the minds of many of them the war is about over, and a lot are not quite positive just where they are fighting. One young Jap, a farmer by preference and a pilot by decree of the emperor, made an interesting prediction in the Solomons. After being ignominiously harpooned by a Grumman *Wildcat*, he parachuted down and, to his captors, commented on the loss of Guadalcanal, of which he had just been apprised. "Yes," he said, hissing pleasantly, "you get Guadalcanal but you never get Pearl Harbor back."

The Japs pick up our ways fairly

These great ACTION sequences made with Fairchild gun cameras!



In newsreels recently, you've probably seen plenty of movie sequences showing Messerschmitts, or Zeros, being literally 'blasted' from the skies. These pictures were taken originally *not* to furnish you with entertainment; rather, to furnish our armed forces with *indisputable proof* of enemy planes destroyed!

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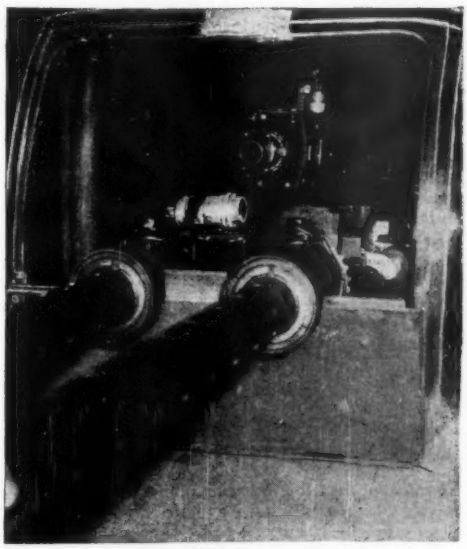

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rapidly. During the past year they have imitated our tactics frequently. The pattern has been for us to work out a tactic and kill quite a few Japs with it; then the Japs copy it, and after this we work out something different and kill some more Japs. It is seldom that the Japs catch up; they seem to be notably deficient in initiative. The truth is, without a doubt, that the Japanese are in no way our physical or mental peers. Having lived in a state of thorough regimentation all their lives they are inexpert at creative thinking. They are moderately adept at learning things by rote, including flying and fighting, but in the face of new developments they are often helpless.

When the leader of a Jap bombing formation is shot down the rest of the pilots frequently fly around as confusedly as a flock of chickens eluding a weasel. Once four U. S. Navy cruisers were steaming up the Kula Gulf and the Japs, then being established rather firmly in those parts, showed up with 18 dive bombers and 12 Zeros. All we could get up in opposition at the moment were four ancient *Wildcats*. Presumably the Japs weren't expecting opposition, because when the *Wildcats* dropped in on them the dive bombers all went helling for home and most of the Zeros were shot down. We lost one plane, but the pilot was picked up by a *Catalina*. As a rule, when our planes go down in anything resembling a friendly area the pilots are saved by our excellent air-sea rescue organization [see Dumbo in this issue]. Shot-up Japs, on the other hand, rarely get out of their planes alive. When hit the planes usually explode and burn quickly.

An attempt by the Japs to copy our four-plane section tactics failed to work out. The whole business appeared to be too complicated for them; what emerged from the imitation was, according to Navy pilots, one of the most muddled exhibitions in modern aviation. An outstanding example of Jap stupidity is their frequent failure to look around thoroughly. In one recent battle a Marine *Corsair* flyer saw the pilot of a Zero that went flashing by look carefully ahead and to the right and behind him—in every direction, that is, except toward the Marine. This proved, as it turned out, to be just the direction he should have looked. The Marine got a little altitude, dived down and installed the Jap comfortably in the Shinto pantheon.

Not long ago a Navy pilot, wounded and confused, mistakenly joined a Vee of Japs flying home after a scrap. They rode along in formation for about 10 minutes, during which one of the Japs looked over and smiled pleasantly, and then the Navy pilot somehow became aware of his error and departed. Later he decided that the Jap who smiled must have had especially poor eyesight. Japanese gunnery is still as bad as ever and perhaps a little worse. Ordinarily they won't try difficult deflection shots; their favorite approach is a high stern run involving about the kind of marksmanship that would be required to knock a tomato can off a fence with a 10-gauge shotgun.

A fine example of Jap stupidity was seen at Rabaul in February. A *Corsair* was hit by antiaircraft fire while we were beating up the shipping in Simpson Harbor, and arrived on Jap ground in fairly good condition. Instead of patching it up and using it as it was, the Japs painted it black and, whenever they got a chance, flew it around so that we could see it. Apparently the idea was to show us what a neat trick they had pulled off capturing an American airplane intact. The trick backfired, however, for American pilots were told to watch out for the plane and before long one of them knocked it down, this time for good.

Occasionally, of course, our yellow enemy works out something pretty smart. At one point during the past winter we were having a little trouble in the South Pacific with Japs jumping on our fighters at the extreme outboard edge of a scissors, which is a standard maneuver for fighter escorts. Needless to say, it took us only a short time to offset this with a slight tactical change. On the whole, mental agility is not an outstanding Jap characteristic. To quote a Navy *Hellcat* pilot, "The average Jap just hasn't got the mind for this kind of quick-thinking work. If we had a plane that could turn with them, we'd murder them all within a week."

Generally speaking, the same difference between Jap and American planes exists today as in the early part of the war. The Jap fighters still outmaneuver ours but can take much less punishment. A new Jap fighter, which we designated by the code name of *Tojo* is believed to have self-sealing fuel tanks and protected oil tanks. Of radial engine design, it is similar to the *Thunderbolt* but a little smaller and reputedly a little faster. Although this plane marks the first Jap attempt to follow our preference of ruggedness to extreme maneuverability, its armor, fortunately, is no protection against the .50-caliber machine gun.

The most common type of Zero is still the *Zeke*, or Mark 1 fighter. It is 39 feet in wing span and 29 ft. 7 in. long. Its maximum speed is about 300 knots at 16,000 feet. The armament of the Zeke consists of two 7.7-mm. synchronized guns in the nose and a 20-mm. cannon in each wing. Two other Jap fighters are the *Hamp*, which is longer and faster but has the same armament, and the new *Tony*, whose chief distinguishing feature is improved armament—two synchronized 12.7-mm. guns in the nose, a 7.7 in each wing and a provision for a 37-mm. cannon to fire through the propeller shaft. The Japs are still using a large number of float Zeros which are rather ineffective because of their comparatively slow speed. All the Jap fighters except the new *Tojo* still blow up if hit anywhere near the engine. They literally explode and then burn all the way down to the water. It makes a pyrotechnic display that is quite heartening to watch.

The Jap torpedo bomber known to us as *Kate* is capable of 200 knots speed at 10,000 feet, is 33 ft. 9 in. long and has a wing span of 52 ft. 6 in. In addition to its bomb load, it has two 7.7 synchronized guns and two free 7.7's. The *Val*, or Aichi type dive bomber is 35 feet long and 47 feet across the wings; it has about 210 knots at 13,000 feet and roughly the same armament as the torpedo plane. The Japs are believed to have some new and improved torpedo planes in action lately but statistics on them are yet lacking.

Typical of the Japs' strange behavior at this stage of the war were the attacks by torpedo bombers against our task force at Palau. The Japs had our force spotted two days before the Palau action. However, instead of making concerted attacks in any sort of strength they sent over torpedo planes in two's and three's and five's, mostly at night. Most of them were cut down promptly by our carrier-based *Hellcats* or antiaircraft fire. The most inexplicable of these attacks was made by nine unescorted torpedo planes that foolishly came over in full daylight the day *after* our first strike at Palau. All these were shot down miles from our task force by the *Hellcat* air patrol. Strategy of this kind is hard to explain; there was slight possibility that these isolated torpedo sorties could do any real damage. Again, it looked very much like a Japanese token show to save face.

The best-known Jap bomber, which we call *Betty*, is a two-engined plane 64 feet long and 82 feet in wingspread. It will do about 275 knots at 17,000 feet; its armament includes a 7.7 in the nose, two 7.7's in the top turret, one 7.7 in each waist blister, one in the belly, and a 20-mm. cannon in the tail turret. This plane, which carries either bombs or torpedoes, is inferior to most of our two-engined bombers in several ways: it won't carry as large a bomb load, its power plants are less powerful, it is slower and, perhaps most important, it is no match in firepower.

For some reason, the Japs seem incapable of building powerful engines. Up to recently, their best product has 1450 h.p., as contrasted with the 2,000-h.p. engine in both our *Avenger* and our *Hellcat*. From the standpoint of equipment, our greatest advantage over the Japanese is still our guns. In the past year the Japs have tried to build a gun modeled along the lines of our .50-caliber, which is possibly the greatest single piece of armament the war has developed, including the rocket. The Japs' 12.7-mm. roughly corresponds in size to our .50-caliber. In performance, however, both guns are refreshingly inferior. The chief faults with them, according to an armament expert, is that they have a slow rate of fire, they lack high muzzle velocity, and their ammunition is inferior. "Otherwise," the expert said, "they are wonderful." Even the Jap 20-mm. cannon won't pierce our planes' armor except at very close range. Our .50-caliber, on the other hand, will pierce any aircraft armor the Japs have.

A curious aspect of the Japanese air war is that, presumably, there are no well-known Jap aces. Of course it is quite possible that there *are* no Jap aces. but it seems odd that the Jap radio programs seldom extoll individual pilots As this is written, no Jap pilots are known by name to Americans fighting in the Pacific. Occasionally a Jap will turn up on one of their radio shows and tell some

(*Continued on page* 214)

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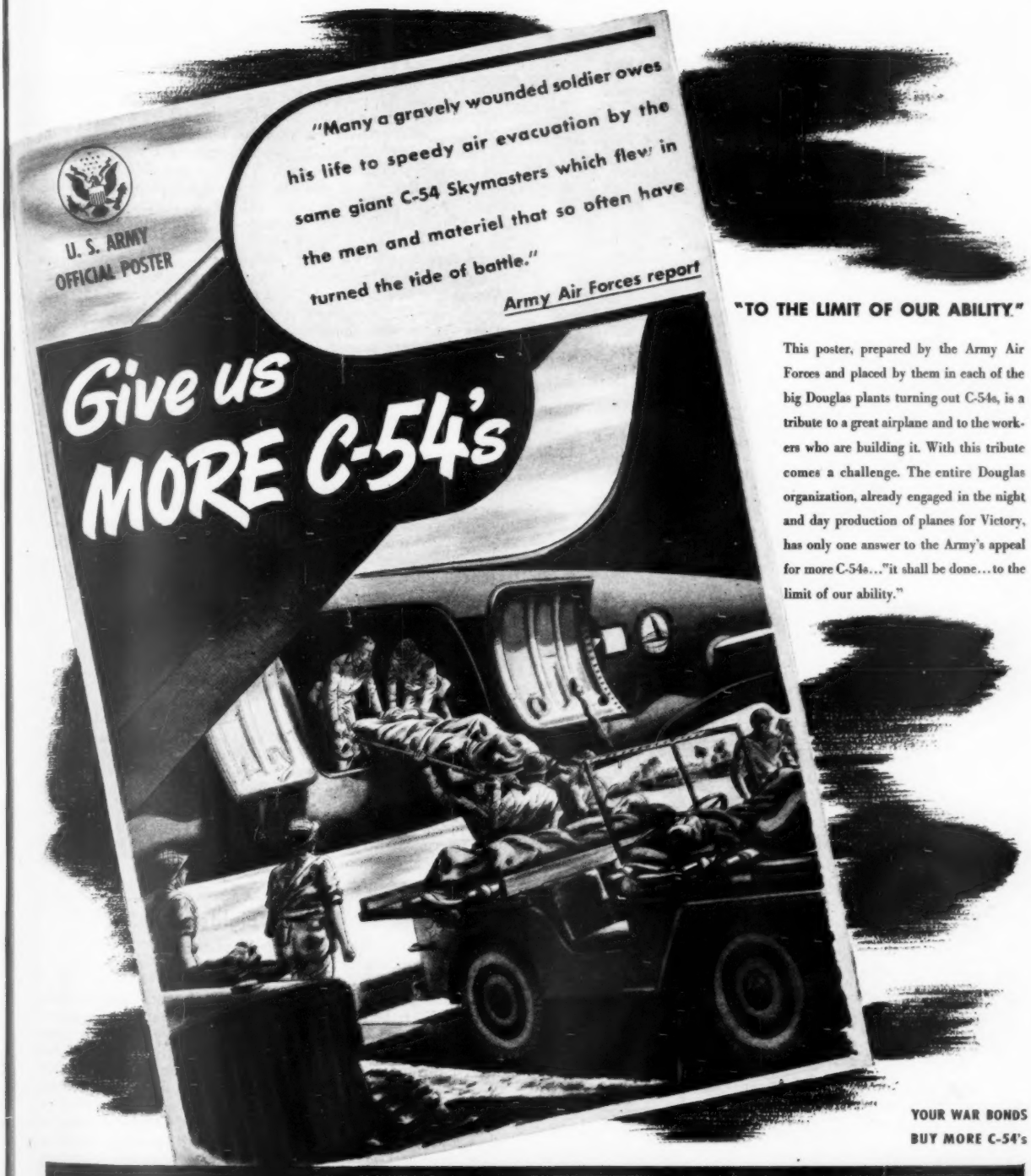
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"Many a gravely wounded soldier owes his life to speedy air evacuation by the same giant C-54 Skymasters which flew in the men and materiel that so often have turned the tide of battle."
Army Air Forces report
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"TO THE LIMIT OF OUR ABILITY."

This poster, prepared by the Army Air Forces and placed by them in each of the big Douglas plants turning out C-54s, is a tribute to a great airplane and to the workers who are building it. With this tribute comes a challenge. The entire Douglas organization, already engaged in the night and day production of planes for Victory, has only one answer to the Army's appeal for more C-54s..."it shall be done...to the limit of our ability."

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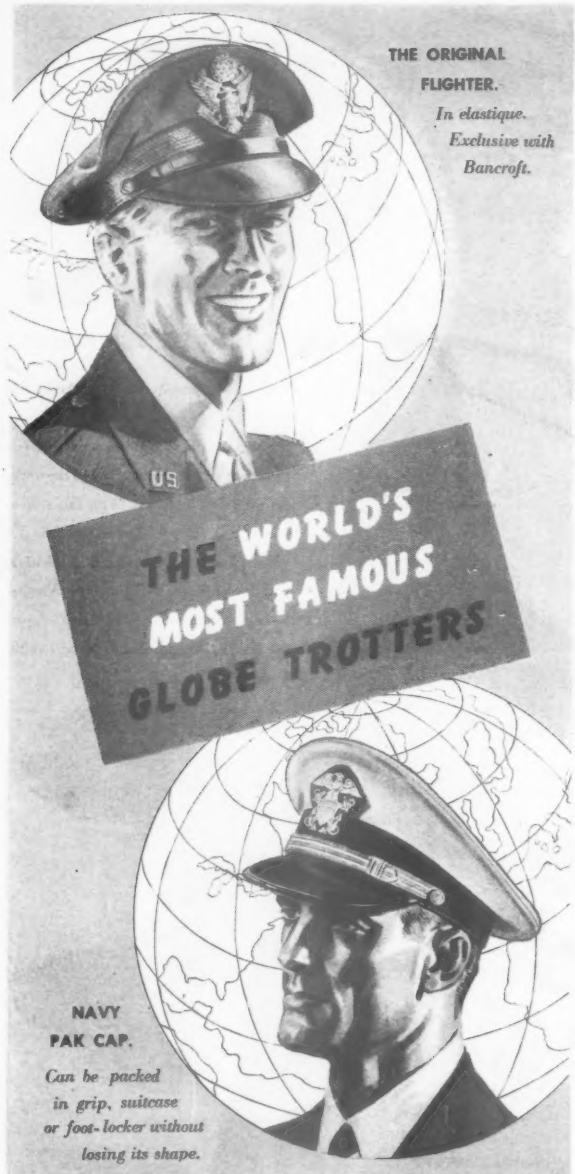
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assorted lies about how the fighting is going, but no particular effort is made to publicize him individually. Often his name won't be used at all. Not long ago a group of Navy flyers at Efate were listening to a Jap broadcast which featured a dive bomber pilot. He was fairly modest about his bag of American fighters, saying he had knocked off eight in about a week and a half, but added that he'd had fairly good luck with the surface ships. "I sink four aircraft carriers, three battleships and lots other things," he said. The Jap planes, he felt, were the best in the world, and the war was about over. All this came as quite a surprise to the boys at Efate; they said it was one of the most enjoyable broadcasts they'd heard since they'd been there

The Japs have made much of their supposed ability to exist in the jungle on things like caterpillars, pandanus leaves and rainwater. And we, foolishly, have abetted them in this misconception. By now most Americans think the Japs operate in the jungle with the speed and efficiency of a sabertoothed tiger. The truth is amazingly different. In the jungle the Japs are as inferior to us as they are in the air.

Jap pilots shot down in wild, unfamiliar areas have, we believe, considerably less chance of survival than ours have. They lack the initiative to scramble for themselves unless they have had long training of the sort. Japanese ground troops who have spent much time in jungle fighting naturally acquire some knowledge of it, but any new situations leave them baffled. American pilots down in thick, unwholesome jungles make out much better on the available foods and are more immune to jungle diseases than the Japs. Our island-hopping strategy had made it necessary for us to by-pass certain places in the Solomons and leave the Jap residents more or less stranded. Occasionally a subsequent visit to one of these islands will result in the capture of a prisoner or two. The condition of these men is seldom good. It appeared that they had first eaten what supplies they had on hand, then they stole and devoured the produce of the native gardens, and after that they just sat down and twiddled their thumbs.

As to fishing and hunting, it hadn't occurred to them and they weren't very good at that sort of thing anyhow.

All in all, during the past year the Japs have exhibited a spectacular decline on all fronts. Certainly there is less and less evidence that they are the wonder fighters we foolishly allowed ourselves to believe at the outset of the war. They still should be fought carefully and with all possible vigor, but no longer should we approach them with a lack of confidence. The Jap flyer is erratic, uninspired, inaccurate and often fearful. By comparison, the average American pilot is Superman with a .50-caliber gun. END

VF—The Fighters

(*Continued from page 57*)

"At this point we got a very tough break. The towering clouds, which had given us such good cover on the way to Bougainville, got us into trouble. The bombers put their noses down to gain speed for a quick withdrawal from the area; they ducked through a valley in the clouds. The P-40's flying low support and the *Corsair* division flying just above the bombers were able to keep sight contact and stay with the bombers, but the other two eight-plane divisions of *Corsairs* flying top cover had to go around the clouds and they never found us again. That cost us more than half of our fighter escort strength.

"Just then the Zeros arrived. There were 30 of them, and right away the going got plenty rough because the eight P-40's remained close beneath and abeam the *Liberators* in an attempt to break up head-on attacks, while my five *Corsairs* covered against attacks from above and behind. Those five actually comprised the high-cover for 26 bombers against 30 Zeros.

"We were 300 miles from home and it was a running fight every minute of the first hundred miles. The Zeros were very aggressive, particularly in attacking the bombers from below and behind. My wingman, Lieut. Bill Johnston, and I counter-attacked four or five of the below-rear attacks by making regular overhead gunnery runs, which we started about 5,000 feet above the bombers. We picked up so much speed in these dives

(*Continued on page 218*)

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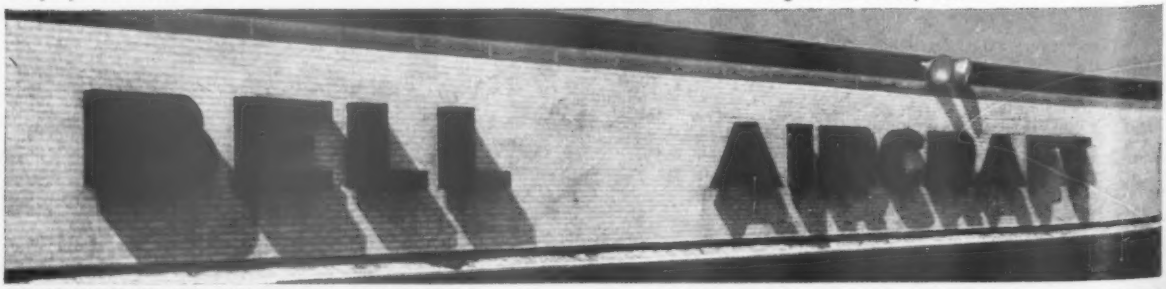

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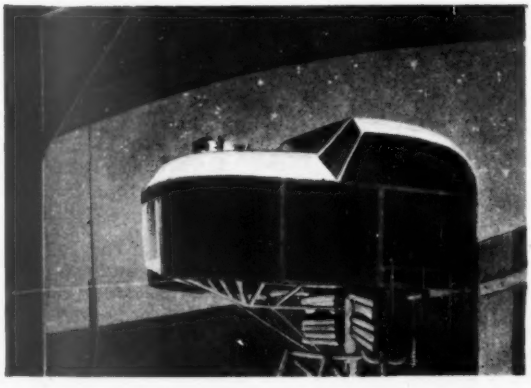

THE LONG-GUARDED secrecy of Sasebo, important base since 1886 of the Japanese Imperial Navy, was rudely shattered July 7, 1944. At dusk on that day, there suddenly appeared in the sky above Sasebo a strong formation of American bombers. From each plane, in quick succession, hurtled tons of demolition and incendiary bombs.

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(*Continued from page* 214)

we had no difficulty in keeping up with the *Liberators*, especially since the whole bomber formation had to slow down in order to keep one crippled B-24 in position.

"On about the fifth pass a Zero got on my tail. He put seven 20-mm. cannon shells and 20 other bullet holes into my wings and fuselage. And then Johnston shot the Jap off my tail—not a second too soon.

"During all this, the P-40's were holding their position very well and they stopped all of the head-on attacks. But one of them was apparently hit early in the fight because he seemed to have trouble keeping up and when he finally drifted too far below and behind the bombers they nailed him. The last I saw of him he was dropping away from the formation with black smoke pouring out of his belly and a Zero still on his tail.

"The Japs still had us outnumbered but we had cut down the ratio by knocking off five Zeros at a cost of one P-40 and that seemed to discourage them a little. Toward the end of the fight the main body of the Japs flew along about 1,000 yards behind the *Liberators* waiting for someone to drop out of formation.

"In spite of our lack of numerical superiority we were able to break up their attacks. The answer was teamwork. The Japs had to be content with making stabs at our one weak spot—approaching the bombers from astern and below. When they attempted a side approach we could usually turn them away by firing a short burst at long range. One look at that red tracer was enough in most cases, although occasionally one would fly right smack through the formation. Those Japs wanted to die for Tojo, and we gave them all possible co-operation. But those few were the exceptions. The smarter Jap pilots had seen that kind of fighter-and-bomber combination before and they knew what it could do to them. So finally, when they got low on gas and ammunition, the Japs gave up and went home.

"Fortunately for me, I was able to stay in the air long enough to get back to our outlying base on New Georgia island, where I crash-landed on a beach. It was the first time I had failed to bring my plane home, *but we got all the bombers back*—some of them pretty badly shot up, of course, but we brought them all back home, and that's the point I want to emphasize."

Returning from a mission, pilots are usually in a high state of excitement. Air Combat Information officers must then employ great tact to get a clear report on what took place. Sometimes the pilots themselves are not aware that they are keyed up and are surprised when they have difficulty at something like lighting a cigarette. As they crowd into the ready room they are all talking at once and making gestures to illustrate the maneuvers they are describing. On these occasions their language is too rich in imagery to be reproduced in full. However, a somewhat expurgated version of the proceedings after a recent visit to Rabaul might be of interest:

One Marine (climbing out of his parachute): "God damn it, boy, you're lucky to be getting back here. Last time I saw you there were two *Tony's* on your tail and there wasn't a damn thing I could do about it."

"You're telling me. That monkey had me bore-sighted. I got a 20-mm. in my tail and it blew it all to hell. I came wobbling in here like a sick duck. I don't know how I got down."

"Congratulations, Don. Hear you got two."

"Yeah, I got two. Turner got one and Wally got one. I was lucky as hell. One of the Japs I was chasing just turned right up in front of me. I let him have one short burst and he blew up right in front of my eyes. I could see him still burning on the water 10 minutes later. The other hoot owl was on my tail and I dived away from him and when I came back up he was doing a slow roll and I got in a full deflection shot—long burst—and raked him clear down. He started smoking and I chased him down to about 50 feet and saw him crash into some trees. Those rascals are crazy. That's my opinion, and I think they're getting crazier."

Shot-up man: "That guy on my tail wasn't crazy. He had me bore-sighted. First thing I knew I heard a hell of a crash and I thought I was in the drink but she kept right on flying."

ACI officer: "Sapp, those two of yours —were they *Tony's* or what?"

Sapp: "One was a *Tony* and the other, I think it was a *Tojo*. Must have been. I got in a long burst and he didn't blow up. Just smoked. It looked a little like a *Zeke* but I think it was faster than a *Zeke*. Make it a *Tojo*."

ACI officer: "What about hits, boys?"

Marine: "I saw a lot of near misses on those barges up near shore."

Another: - "I saw one hell of a hit right in the middle of a freighter. I was trying to shake that *Zeke* off my tail and I dived and just as I pulled up I saw that hit. It was a hell of a hit, squarest I ever saw."

Another: "What were those flashes I saw right in town over Rabaul? I saw a lot of big flashes. I never saw anything like it before."

ACI: "I don't know, rockets maybe."

Another pilot: "Boy, I thought I'd got me a *Betty* on the way back. I came out of a cloud and I saw this guy flying low. I took out after it and when I got up close enough to see I saw it wasn't a *Betty* at all. It was a *Ventura*."

The Navy's Skull-and-Crossbones is an especially successfully fighter squadron. It was organized January 1, 1943, in Norfolk, Va., with Lieut. Comdr. John Blackburn in charge. Recently, in the middle of its second six-week tour of duty, this squadron had 154 Jap planes to its credit —an undisputed record.

From the start, the Skull-and-Crossbones operated on a kind of strength-through-joy program. The members did their training work thoroughly, but it was their skipper's notion that they should also have a good time doing it. According to Blackburn, the squadron was virtually invited to leave Norfolk on account of miscellaneous skylarking. Removed to Manteo, N. C., it soon enhanced its reputation for color and all-around vitality. The neighboring citizens kept complaining that the pilots were in the habit of buzzing automobiles, pedestrians, baby carriages, outdoor privies, and anything else available.

"We also buzzed the other fields around there," Blackburn said. "We figured we would be considered antisocial if we didn't."

However, since the Army and other adjacent services got a little huffy, the Skull-and-Crossbones squadron announced that it would be on "combat patrol" over its own field every day at a certain time. The result of this, as one pilot reported, was that "every airplane for miles around would come in at that time and fight like hell."

After three months of this vigorous training, the Skull-and-Crossbones moved out, by popular consent, and took a shakedown cruise on their carrier. In October of 1943 the members went to Pearl Harbor and thence to the South Pacific where, flying *Corsairs*, they replaced Fighting 18, a *Hellcat* squadron. At Ondonga they went on their first mission, a sweep which netted them exactly nothing. A few days later, however, they visited a nearby Jap base and shot up practically everything in the harbor—several barges, a couple of transports and assorted docks and piers. On November 1, the Japs sent down a heavy strike of bombers with a fighter escort. Eight members of the Skull-and-Crossbones were in a position to intercept. The odds, it was computed later, were about 8 to 45. Notwithstanding, the eight *Corsair* pilots turned the oncoming Japs around, shot down six planes and lost none. In five weeks at Ondonga the squadron chalked up 48 kills. Lieut. "Butch" Davenport's flight knocked off six *Zekes* in one fray, including a Jap officer who came over to find out how the six planes were lost. Davenport shot him down.

By February 19, after a period of rest in New Zealand, the Skull-and-Crossbones had knocked down 106 planes. On February 19, an active day, the squadron added 16 planes on one strike against Rabaul. Today, nearly all the 36 squadron members have at least one Jap accounted for. Blackburn, who holds the DFC, has 11. Lieut. (jg) Ira Kepford, a former All-American fullback at Northwestern, has 16. Lieut. (jg) Earl May has eight; and Lieut. Comdr. Roger Hedrick has nine. Thirteen members of the squadron are aces, but Blackburn points out that it is unfair to grade pilots by the number of planes they have shot down. Some of the best pilots in the squadron fly positions in formation where they seldom get a chance at Japs and consequently do not have impressive scores. The group includes several well-known athletes. Besides Kepford, there are Lieut. Harry March, former national Pentathlon champion; Lieut. (jg) W. C. Wharton, a champion gymnast; and Lieut. Tim Gile, who stroked a crew at Yale. The smallest and possibly the feeblest-

(*Continued on page* 222)

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(*Continued from page* 218)

looking member is Lieut. Hal Jackson, who is acknowledged to be the coolest hand and best shot in the squadron. Lieut. "Duke" Henning, a slight, bearded man, used to be a history teacher at Harvard. Lieut. L. F. Herrmann is flight surgeon.

Believing that a drink of something cool in the evening after a tense and exhausting day has great therapeutic value, Herrmann sees that there is always something on hand. Sometimes, while the boys are away on a mission, he loads up a plane with beer and sends it up to extreme altitudes so the beer will be good and cold when the pilots return.

Harry Meeteer, the squadron yeoman, who has a ghastly yellow beard that is the envy of all, was a certified public accountant in peacetime and operated his own business in New York. He is much leaned on for such services as catching centipedes for fights in leisure hours, writing letters home for the pilots to sign, and lending money at no interest.

The Skull-and-Crossbones squadron has a superficial air of extreme informality but actually it is operated by a system of sensible discipline, which in no way hampers individual expression. As a result, morale is unusually high. This condition is due in great part to intelligent direction.

Blackburn, a graduate of the Naval Academy in 1933, normally lives in Washington, D. C. He is 32 years old, married, and has a son, six, and a daughter, four. A short, wiry, nervous man, he instills in his squadron the same dynamic energy that enabled him to fly 168 hours in one five-week period, an endurance feat which none of his boys have yet topped. Blackburn served in a carrier squadron off Africa before organizing the Skull-and-Crossbones. He went down near Casablanca and drifted on the water for three days before being picked up. His father, Capt. Paul P. Blackburn, and his brother, Paul Jr., a pilot, are also Naval Academy graduates. Lieutenant Commander Blackburn has an almost pathological aversion to publicity, and hence is relatively unknown. His teammates, however, consider him the best fighter pilot the war has produced.

Blackburn might conceivably be called an unregular regular Navy man; his squadron, in fact, is occasionally referred to as "Blackburn's Irregulars." Although he has strict rules for behavior in combat, he has never hesitated to try an innovation that strikes him as worthwhile. For a time he decreed that any pilot who left a formation without authorization would be fired, but he later tried out a system of letting a number of his high cover wander about on their own. This experiment, which resulted in four downed Zeros on its first trial, developed into the "roving high cover" that has greatly increased fighter protection to our Navy bombers.

Because of its skill, the Skull-and-Crossbones squadron gets numerous overtime assignments. The members seem to take particular nourishment from adversity. On one occasion a pilot, one of the most popular in the squadron, was reported lost. It later turned out that he had been forced down on the water. All his colleagues were much worried. They got into their planes and went on long extra-official search missions. At length somebody spotted a rubber boat near one of the Jap-held islands, and the news was flashed back to Dumbo. Several of the squadron members accompanied the *Catalina* on its rescue trip. When the rubber boat was finally located, the *Catalina* sneaked down, looking out for Japs, and taxied up alongside. The pilot was seated comfortably on his raft eating a piece of chocolate and fishing—for sport. He had quite a catch, which he exhibited, and then he asked the party to stick around for a while as he had run into a considerable school.

It is this kind of spirit that the Japs have found so difficult to counter. END

Night Fighters

(*Continued from page* 63)

in *complete darkness and without lights of any kind to guide him.* This established for once and all that night fighters could operate in complete darkness and without compromising the security of the ship. It was a triumph of specialized technological skills and equipment.

The story has a punch line. On the next night, Comdr. R. E. Harmer, skipper of a night fighter squadron, aboard another carrier in the same task force, scored the first kill by a carrier-based night fighter. He was officially credited with a "probable" when he sent a Jap plane flaming toward the sea.

While the action off Truk was not the first use of night fighters in the Navy, it did mark the first successful night combat from carriers at sea.

Six months earlier—in August, 1943—night fighters had made their debut in an American theater of war. Manned by Navy and Marine Corps shore-based pilots, these were rushed to the Pacific in an emergency and promptly went into action in the Solomons. Their early experiences were rather comparable to the fledgling phase of carrier aviation aboard the old Langley, when makeshift and daring were the pilots' chief tools.

Under the command of Comdr. "Gus" Widhelm, dive bomber hero of the Battle of Midway, the first Navy echelon arrived in the Solomons shortly before a Marine Corps squadron commanded by Col. Frank Schwable. The most urgent calls for help at night were from Henderson Field on Guadalcanal. There the Navy learned the importance of night flying—although in a sort of reverse order. Jap bombers were coming over every night and they hung around nearly all night long. Of some help were Army *Lightnings* working with searchlights, but this defense was not a complete solution. The Japs solved the problem of searchlights—and without them the *Lightning* pilots were blind.

It was during this stage that Widhelm turned up with a few *Corsairs* from his squadron. His unit, scarcely trained, was rushed in in such a hurry that it preceded by five months the rest of his squadron. Widhelm took his *Corsairs* step by step up the islands from Espiritu to Bougainville, knocking off Japs en route. They got one Jap while patrolling at Munda and they added six more at Bougainville and Green Island. During this process they lost one plane and saved the pilot.

Meanwhile the Marines had not been idle. In November of 1942, Colonel Schwable organized a Marine night fighter squadron. Feeling that we were getting a late start in night fighter technique he had gone to England to study British night fighter tactics and had returned to organize the first Marine Corps Squadron. His outfit also left the United States in 1943, heading for the Russells but winding up in Munda, where the hunting was better.

There was a great difference in the equipment used by early Navy and Marine night fighters. Widhelm's squadron used the single-seater *Corsair*, whose chief merit was its ability to go up to 40,000 feet after high-flying Jap bombers. The Marines, using twin-engined *Venturas*, were unable to reach such high altitudes but were much better equipped for patrol work. Also, it was contended by some that the complexities of night fighting were more easily handled by the *Venturas'* three-man crews.

Widhelm was the central figure of an anecdote involving bad weather flying. One stormy night when his squadron was based on Munda, a call came from nearby Ondonga that a Marine there had suffered a ruptured appendix and needed an immediate emergency operation. The only way his life could be saved was for somebody from Munda to go pick him up. Flying conditions were impossible—no ceiling and no visibility. Added to this, the Ondonga air strip was not yet completed. However, Widhelm warmed up a 125-h.p. Stinson, which had been used for ferrying, and took off into the murk. Somehow, he made Ondonga and landed in one piece on the rutted strip. Then, when the Marine was loaded aboard, he flew back to Munda in the rain. The Marine, incidentally, was successfully separated from his appendix.

Widhelm's outfit shared with the Marines the heavy patrolling of Munda—much of it the dawn and dusk patrols during those periods of fading, uncertain light known at sea as "The Betty Hour," a reference to our nickname for one of the Japs' twin-engined bombers. They are the periods of likely attack and the hours when the Jap *Bettys* push their noses over the horizon on reconnaissance.

Both Navy and Marine pilots flew thousands of hours under discouraging conditions in the Solomons. An account of one operation is given by Marine Lieut. John Plunkett of the squadron formed by Colonel Schwable (and later taken over

(*Continued on page* 226)

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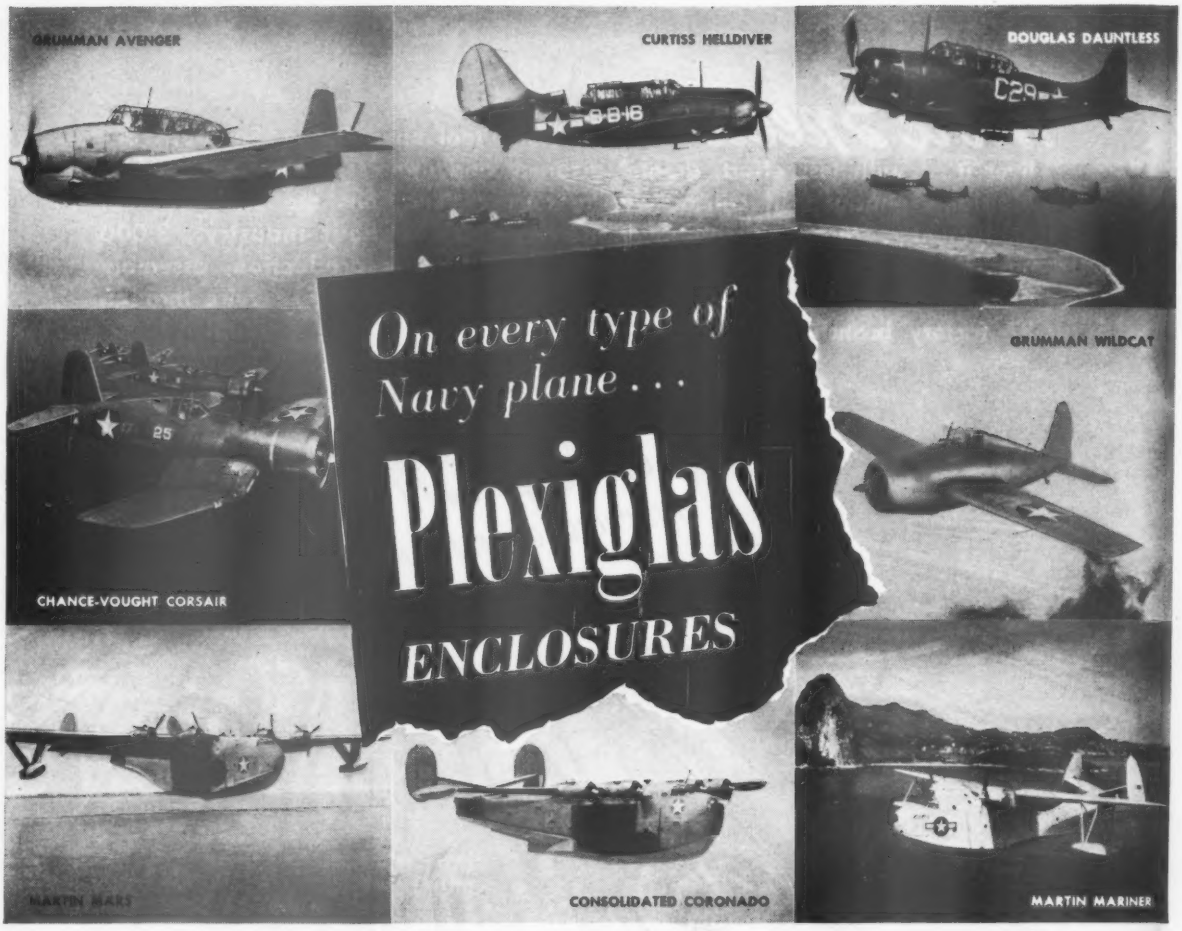

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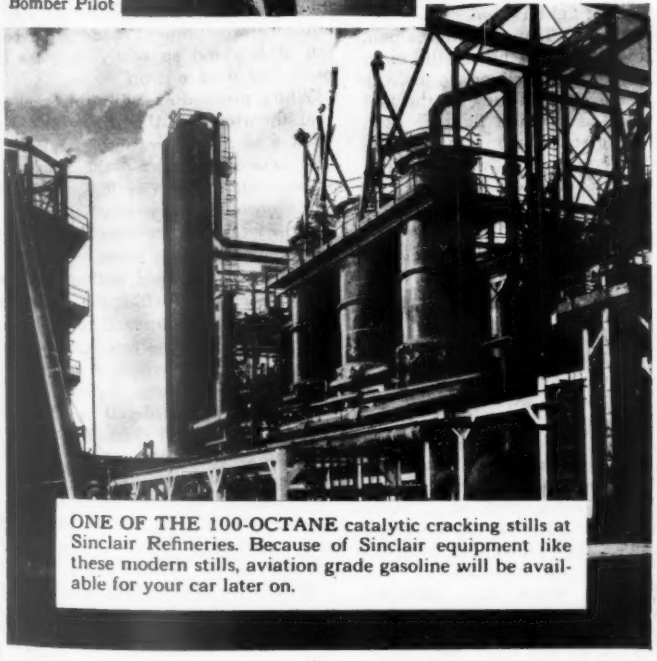

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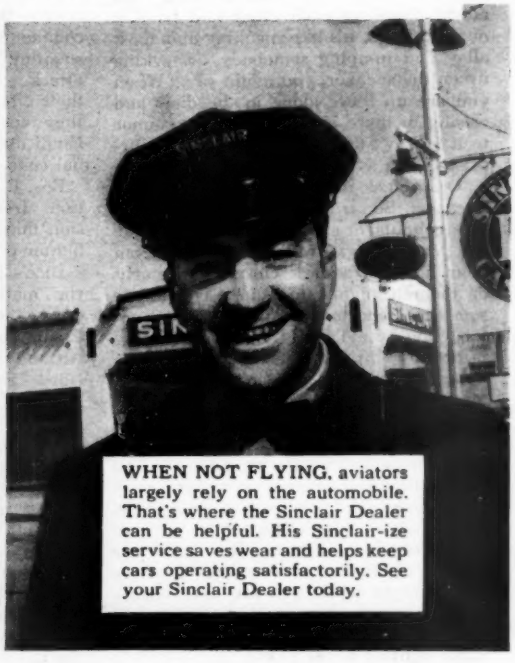

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(*Continued from page 222*)

by Lieut. Col. John Harshberger). Plunkett reported:

"We were cruising over Green Island about 3 a.m. At about 5,000 feet we picked up two bogeys and started after them. The Jap evidently saw us at about the same time we made contact—we were on his tail—and he started taking violent evasive action. He looked funny there in the dark, a big gray shape weaving from side to side. But he was silhouetted against the clouds and I fired one long burst and then a short one. He ducked for the water and I got in another long one. He hit like a ton of bricks and just blew up. He made a big orange fire you could see for a long way off in the night."

Another Marine squadron, commanded by Maj. E. H. Vaughan, USMC, went to the Pacific in 1943, basing first on Tarawa Atoll, then flying its *Corsairs* north to the Marshalls after the capture of Kwajalein and Eniwetok. This group got into action early in the spring. In a spectacular action, it intercepted a flight of a dozen Jap night raiders off Eniwetok. The Marines shot down three planes and completely routed the rest.

This demoralization of the enemy, incidentally, is a powerful psychological weapon of night fighters. Unseen, the night fighter strikes without warning. The sudden orange flare of exploding gasoline in the darkness may be an enemy's first warning that trouble is near. And this terror often has as great an effect as the bullets which hit an enemy plane. The formation is broken up and the raid stopped—which is the main purpose of night fighters.

"The psychology of the night fighter is not knightly," says Lieut. Comdr. "Pete" Aurand, the skipper of another night fighter squadron which was the second carrier-based night-fighter squadron to join the fleet. "In day fighting," he added, "you see each other and have it out. At night, it's like sneaking up a dark alley and jumping somebody. Sneaking up on the sneaker, you might say. When you are up there alone in the dark and closing in there is kind of a grim humor to it. 'Wow, this guy is going to be surprised,' you say to yourself.

"On a black night it's just like hanging in space. So far as you know about your whereabouts, or even if you are right side up, you might as well be hanging from your heels in a dark closet. On starlit or moonlit nights, of course, you have some light and to a good night fighter pilot flying by moonlight is just like flying in the daylight. But one thing every night fighter pilot learns at once—or he doesn't learn anything—is to trust his instruments. Your sense and your instruments often disagree and you can't fly partly by instruments and partly by contact. You must follow your instruments. They don't have sensations in the seat of their pants.

"You don't feel alone when you are over your own force. But there's a mighty big feeling af aloneness up there in the night when you are over enemy territory and ships—but I think that aloneness is one of the big attractions of night fighting to the pilots."

Night or cloud—zero-zero conditions—is the normal situation for the trained night fighter. He is as much at home on instruments as the day fighter is on contact flying.

It is by no means a picnic. During the Gilbert Islands invasion, Lieut. Comdr. E. H. ("Butch") O'Hare, wearer of the Congressional Medal of Honor, was lost repelling a night attack at sea. He had recently become a night fighter, having been transferred to this duty at his own request. The Japs' daylight attacks had been checked and their tactics countered with enormous losses before the Gilbert invasion. Then, skillfully, the Jap revised his tactics to use darkness, sending night torpedo attacks in large numbers.

O'Hare took off one night to test the theories that he had worked out on intercepting and repelling night raids. With another fighter, and with a specially equipped torpedo plane, he sought to break up an in-coming attack. Lieut. Comdr. John Phillips, commander of the carrier's torpedo squadron and pilot of the night torpedo plane, shot down two enemy planes. When the lights were turned on for the join-up, however, O'Hare failed to appear. A Jap plane was believed to have infiltrated into the group and shot him down.

During the Marshalls operations, carrier-based night fighters flew daylight instrument conditions for torpedo squadrons, then participated in the Truk raid during which Reiserer and Harmer chalked up their "firsts" against the enemy. The doubts about night fighting aircraft began to disappear. Henceforth they were to become an integral part of carrier operations.

On the raid against Saipan which followed the Truk strike, Aurand's squadron increased its score and earned a group commendation. Flying intruder missions right after sunrise, through bad cloud and storms, the night fighters under Aurand's command strafed Tinian and Saipan, shooting down five Japs before the main attack. They were inclined to belittle their effort, however, in view of the fact they operated as a "day fighter" unit. Night fighter pilots consider daytime visual conditions an unfair advantage!

Ens. R. W. Bice was lost on this operation. Ironically, it was on a daylight mission that he became the first Navy night fighter pilot to be reported missing.

Bice's loss was avenged by his squadron mates. Ens. John R. Bertie shot down three Japs, Aurand got one, and Lieut. (jg) N. L. Davisson got another. Aurand was cited and Bertie awarded the Navy Cross for his action. After making his first kill, Bertie was wounded, his compass shot up, and his plane riddled. Despite his wounds and the condition of his plane, he shot down two more Japs before returning to his carrier.

Most night fighters think other pilots have all the fun. Prior to the Truk and Saipan raids, the pilots of Aurand's squadron typed up citations for the "Chair Medal," which they awarded themselves for sitting "courageously" in the ready room on watch all night while the day fighters got the Japs. This cheerless outlook changed after the Saipan action when they began knocking the Japs down themselves.

Night fighter pilots take deep pride in their instrument flying and navigation. Probably no other class of navigator is so thoroughly trained in instrument work. His life hinges on the instruments in his cockpit. Without them, in the darkness, he would be lost. A single star at night makes the experienced night fighter pilot feel well supplied with navigational aids. The moon almost overwhelms him.

When Aurand's pilots flew their fighters cross country to ship out for Pearl Harbor they could see the ground for only five hours. Everything else was grounded but the night fighters flew on through and even made instrument let-downs in formation on two occasions. Not a plane was lost.

Night fighting had its genesis in the electronics laboratories of the Massachusetts Institute of Technology two decades ago. The development, gradual at first, came to an abrupt flowering during the Battle of Britain. Just as war always expedites progress in both killing and curing, it advanced the refinement of night fighter equipment so rapidly that England was saved from defeat as a result. During the first phase of the battle the planes operated much as fighters operate in the daytime, depending upon voice direction from the ground and visual contact to find and shoot down their prey. It is interesting to note that the British single-seater night fighters had their greatest successes above the great fires that illuminated the German bombers.

The British soon changed the whole conception of their night fighter work, using twin-engined planes for this operation. What happened is now history, although the details will not be available until the end of the war. Suffice it to say now that the gallant night fighters of the RAF went up and, together with the anti-aircraft gunners, made night bombing of England so costly that the Germans had to give it up.

While proceeding with the same general theories, the U.S. Navy also developed a single-seater night fighter. This was necessary because the single-seater is our standard carrier fighter. The Marines, however, began operations with the *Ventura*. At the moment there seems to be a place for both types. On land, the *Ventura* can be used without having to make unusual adjustments. Night fighter training is going forward rapidly. Much of the credit for the program must go to Comdr. W. E. G. Taylor, at one time with the American Eagle Squadron of the RAF, who was ordered to the United States from Hawaii right after Pearl Harbor and given the assignment of developing night fighters. Moving the M.I.T. equipment to Quonset Point, R. I., he got started late in 1942, and by 1943 the first Quonset-trained night fighters reported for duty in the South Pacific.

What they and the Marines have done in the short time since then holds no promise for the future of Jap night bombing. END

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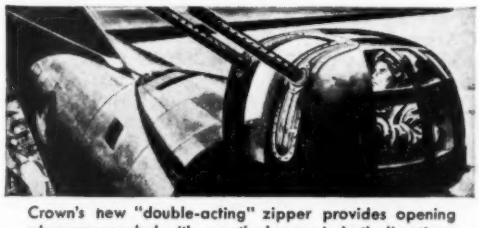

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Dumbo

(*Continued from page 52*)

Squarepeg 34. I've been hit and am smoking. Going to hit the silk at point X-Ray. Calling Dumbo." If he didn't have time to call, one of the rescue planes will probably spot him anyway.

Dumbos have pulled off hair-raising rescues that make the oldtime deliverance of a movie hero from the buzz saw pale by comparison. Once a *Catalina* dropped into the harbor at Ballale—when that base was at its busiest in Jap hands—and picked up two downed fighter pilots. The rescue was carried out exactly 500 yards off shore in the teeth of Jap shore guns, ship guns, and heavy aircraft opposition. To make this possible, every Jap gun in the area was covered by a swarm of our fighters while the rescue was in progress. The Dumbo sailed leisurely into the harbor, circled, put down near some small Jap craft, taxied up to the life rafts carrying our pilots, picked them up, and departed with admirable nonchalance.

Time after time, with battles raging hotly overhead, Dumbo has calmly plopped down on the water in enemy territory to pick up a pilot. Sometimes they are shot up and go home pretty leaky and crippled. But rarely do we lose a rescue plane. Both fighter and bomber pilots are as careful to protect them as a mother hen is to look after her chicks. In the South Pacific, Army, Navy, and New Zealand aviation has been working as a vast team under the Navy's Admiral Fitch, and the pilots of all services give the same considerate attention to Dumbo.

Not long ago near New Britain a strike of big and medium bombers, with fighter cover, was heading fast for Rabaul. One of the Dumbos, poking along and trying to keep up, flew out of a cloud and saw two Zeros coming at him hellbent for leather. Just as the Dumbo pilot began to figure that the jig was up, a whole formation of Army *Liberators* appeared from another cloud and settled down in a tight V directly overhead. "It was funny," one of the *Catalina* crew said later. "I had the odd sensation of imagining I could hear brakes screaming. The Japs are scared sick of *Liberators* armament. One of the Zeros managed to pull up and get the hell out but the other was too close—he was just blown clean apart. There wasn't a piece left big enough to write a letter on."

Now and then in the heart of a big scrap a Dumbo won't even know it is being attacked. Intent on looking for survivors, one Dumbo was recently scooting along near Rabaul, fairly low down, when a bunch of Zeros came out of some clouds and began a chase. Before they caught up, however, six *Warhawks* flown by New Zealanders jumped the Zeros, shot down two of them and ran the rest away. The battle went on for quite awhile but the Dumbo crew continued to look for survivors in blissful ignorance of what was going on.

Often one pickup will run into more. A few months ago a Dumbo was sent down to grab up a fighter pilot during one of our biggest raids. Before the rescue was completed they were joined on the water by another fighter pilot and the crew of a *Dauntless*. Dumbo scooped up the lot and went home.

To protect the *Catalinas*, it is sometimes the practice for fighters to be assigned individual planes and stick right with them all the time. The New Zealanders have been effective at this. The *Warhawks* they fly are best at low altitudes and are slow, which means that the pilots will not have to work so hard doing slow rolls and S turns to stay alongside.

One of the New Zealand protectors came in for a good deal of ribbing after a recent scrap. During the business of keeping the enemy off his Dumbo, which he did with typical New Zealand thoroughness, his engine failed and he went down. The Dumbo he was assigned to casually landed near him, picked up its own fighter cover, and resumed the scrap.

If necessary, the *Catalina* rescue planes can carry large loads. Shortly after the service was organized it was necessary to evacuate some wounded Marines from Enogai Inlet at Munda. A Dumbo squadron volunteered. In a matter of a few hours it had gone into this hotly-contested area and come out with 166 casualties, not losing a man. Both on the way in and out the planes were strafed by Japs and several Dumbo crewmen were injured.

As many as 45 to 50 *Catalinas* have participated in a single mission—looking for survivors of big air battles. The policy of Admiral Fitch in the South Pacific has been to spare no pains in the rescue of Allied fighting men. One time in the mouth of the harbor at Rabaul, once the most formidable of the enemy bastions, several of our pilots and aircrewmen were riding on life rafts after the heaviest raid that had been made up to that time. By order of the commanding officers, everything that we had available—airplanes, submarines, destroyers and even cruisers—turned their attention to the scene. Our subs and destroyers beat up the Jap waters, firing at ships and shore guns; cruisers standing offshore boomed away; fighters tied up Jap guns; and finally the Dumbos settled down in the midst of the confusion and sneaked our stranded men from the very shadow of this powerful Jap base.

Although more than a thousand aviation personnel have been rescued by Dumbo, many other jobs are performed by these planes. They have brought natives off islands for medical treatment, flown a doctor to the aid of a native chief's wife who was about to have a baby, removed missionaries from troubled areas, and ferried gold braid from place to place. During the early days of Dumbo their work was perhaps even more varied than it is now. A couple of case histories from that period will serve to illustrate

"A *Catalina* under command of Lieut. R. A. Melrose, USNR, took off from Halavo at 1630 to search without fighter escort for crew of a USAAF *Liberator* reported down at sea south of Choiseul Island. Flying heavy rain squalls and low ceiling, the plane went northwest to Rob Roy Island where search was instituted along the shore and among the various small islands in the cove formed by Rob Roy and the eastern end of Choiseul. A severe tropical front was experienced west of this area. While circling, the *Catalina* was joined by three *Liberators*, which were also searching for the same lost crew

"When the front lifted sufficiently for reasonable visibility the *Catalina* resumed search to the westward. When over Malaludurano Island about 0800 a Very's light was sighted, apparently having been fired from ashore on a small island dead ahead. Three large yellow life rafts were then seen on a beach with 10 men around them. Despite a heavy sea and large swells, a landing was made in the cove north of Bere Point. The survivors had great difficulty getting their rubber rafts through the surf but after several attempts the entire crew of the *Liberator* was taken aboard."

The crew of that Army *Liberator* all returned to base in medium good shape, another contribution to the war effort by Dumbo. Another report concerns the evacuation of wounded from Enogai Inlet, New Georgia Island:

"The plane, under command of Lieut. (jg) Lane, loaded 15 stretcher cases and 11 ambulance cases at 1710. While loading was in progress the plane was suddenly attacked by two Zeros which made a strafing run from the starboard beam, diving to within 200 feet of the water. The *Catalina's* engines were started, guns manned, and fire returned. An attempt was made to take evasive action on the water while at the same time bringing the waist guns to bear effectively. The Zeros continued their strafing attacks, the second run resulting in the gunner being wounded in the left leg with a 7.7 slug. The third gun raked the fuselage longitudinally from the starboard bow aft as the *Catalina* was taxiing on the step. Shrapnel from a 20-mm. shell wounded the tower mechanic in the left hand. A 20-mm. also exploded in the bunk compartments, fragments causing abdominal wounds to one of the stretcher evacuees. After the third attack, two *Corsairs* appeared and nothing further was seen of the Zeros.

"Continuing take-off, the *Catalina* was found to have a bad oil leak in the port engine—discovered at an altitude of 1000 feet. As it was now 1730, proceeding to Helavo would have entailed a night landing on only one engine and with a heavy load of wounded, so the plane returned to Enogia and landed inside the inlet. The port oil tank was found to be empty on landing. The port engine was cut out at once, but before the attending Higgins could pass a line the plane drifted onto a reef near Shark Island and began to take water rapidly. As a consequence it was decided to stay on the reef until the wounded passengers were unloaded. This was completed at 1930.

(*Continued on page 232*)

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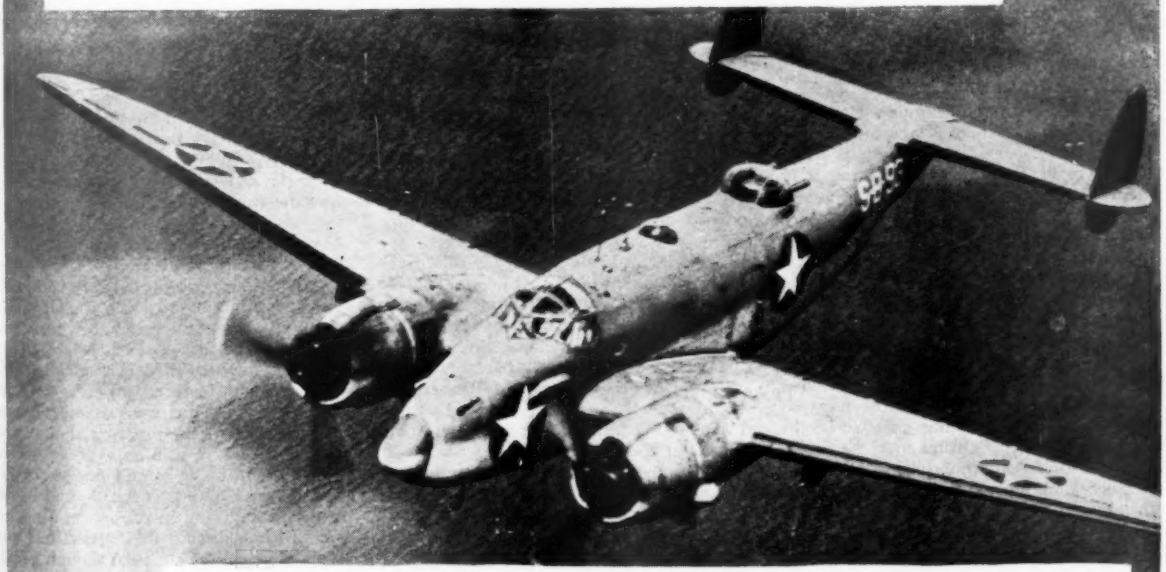

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(*Continued from page 228*)

"With three feet of water in the hull, bailing was begun and by 2130 sufficient progress had been made to find the holes and plug them with rags. The plane floated off the reef without further damage when the tide came in. It was then towed to the Marine pier and secured for the night. A bailing watch was set and the injured men sent to the Enogai sick bay for treatment. Condition Red was called at 2230, with the all-clear coming at 0230 the following day. During this time Jap planes buzzed several barges nearby. At daylight bullet holes in the wing tip float and oil cooler were plugged and 40 gallons of oil taken on. Take-off was made at 1025, the port engine being cut at 2000 feet altitude. Fifteen minutes out of Halavo the port engine was turned up again and a power landing was safely made at the base at 1245."

That mission was moderately hazardous. Some are quite simple, even pleasant:

"A Dumbo plane with Lieut. (jg) R. M. Elberg, USNR, as PPC took off from Rendova Harbor at 0655, Nov. 25, to land at Treasury Islands, pick up Admiral Halsey and his party and transport them to Empress Augusta Bay. Fighter cover of 16 *Corsairs* was picked up at Ondonga at 1710 and course was set for Treasury, where landing was made at 0800. The Admiral and his party were transferred to the *Catalina* by tank lighter and take-off was established at 0815. Landing was made at Empress Augusta Bay at 0905 . . ."

The real origin of rescue work was in Honolulu before the war. A pilot had gone down at sea and, at the moment, there was no boat available to pick him up. It was then popularly supposed that a *Catalina* could not land in rough water. However, a pilot volunteered to try and things worked 'out wonderfully well. Later, when the war produced a need for organized rescue on a large scale, the *Catalinas* were called upon to shoulder the burden. In the beginning conditions were fairly primitive; living quarters were inadequate, communications were spotty, there were no night landing facilities, and operations proceeded largely by ear, so to speak. Now all that is changed. The Dumbos fly from seaplane tenders that have all the comforts of home.

For example, one tender stationed in the northern Solomons is a model of generous hospitality. Pilots who are picked up often hate to leave. One Army major admitted he was going to hang around as long as possible. "I haven't had chow like this in the three years I've been in the service," he said. The tender is managed with mild informality, and everybody has a good time. Each rescued pilot gets a cap especially designed by the ship's crew to identify men brought back from the sea by Dumbo. Once when the supply of these was low a Marine lieutenant colonel refused to leave until they had got some more made. Occasionally, active flyers will be picked up twice and even three times. A Navy *Hellcat* pilot, upon being hauled into Dumbo for his third time remarked amiably, "It looks like I'm getting in a rut."

The rescue men—Dumbo pilots, seaplane pilots, and the *Ventura* pilots who often help out with daily searches—are held in the highest esteem all over the Pacific. Not all rescue missions are successful, of course. Tiny rafts on a tossing ocean are hard to spot. Sometimes long gruelling hunts turn up nothing whatever and again they produce unexpected results. Once a transport pilot reported at an operations office that he had seen three men on a piece of wreckage three miles south of Guadalcanal. He was sure they were alive, since one of them had waved both arms as the transport passed overhead. Lieutenant Colonel Daily warmed up a plane and took off. A few hours later he was back, looking a little vexed. He had found the wreckage all right, and had taken notice of the three large pelicans sitting on it. All three of them had waved both arms at him, but he hadn't stopped.

Among the guiding spirits of the movement perhaps Comdr. F. A. ("Buck") Brandley stands out. Now chief of staff to Commodore George Henderson, who recently relieved Admiral Kendall as Com-Air-Munda, Commander Brandley has become noted, and much admired, among all the Dumbo people for his dogged sponsorship of the rescue service. That his efforts and those of other Dumbo personnel have been enormously successful is evidenced by the fact that more than two-thirds of crashed plane crews who are believed to have had a chance of survival are rescued and returned to duty. These figures may sound coldly unimpressive to the layman; to pilots facing constant death over the unfriendly Pacific wastes they are a promise of home, and family and a good life after the war. "I sometimes forget things I've learned down here," was the recent observation of a Navy youngster, "but I never forget how to call Dumbo." END

Survival

(*Continued from page 163*)

and the like. I shook hands all around, and gave each of them a cigarette. They sang a lot of songs and I taught them 'The Eyes of Texas.' I had to sing it to them about six times, but they got it pretty well. We had a great time."

In a world-wide war, men often find themselves in unfamiliar surroundings. This unfamiliarity tends to magnify one's hazards, and fear of the unknown weakens man by reducing his ability to think and plan. Combatting such fear, through making its personnel familiar with all possible conditions, has been a major educational concern of the Navy. Perhaps no other military service has gone so far in its effort to save fighting men from the hazards of alien surroundings. On at least one occasion, an admiral directed an entire task force to a spot where a pilot had hit the water and was confidently awaiting rescue.

Guadalcanal was one of the great testing grounds for pilot survival. All the planes were provided with emergency equipment and each pilot was supplied with survival equipment such as pistol, knife and first aid kit. Constant instruction in sea and jungle lore was hammered home to the crews.

As a result, the majority of Naval and Marine Corps pilots who were first listed missing in combat, actually survived and were rescued. Some returned in a few hours, others were away as long as eight months. Yet they returned. Survival instruction had paid off and they had learned to shift for themselves under nearly impossible conditions.

Lieut. D. M. Leslie, a Marine pilot, was rescued after 28 days in the jungle. He had been shot down off Guadalcanal in the fall of 1942. Sighted by armed Jap patrols ashore, Leslie paddled outside rifle range all afternoon before floating ashore after nightfall to hide. His account reads in part:

"Upon struggling to get out of my parachute in the water I lost my web belt with my pistol, knife, canteens, and first aid packet, and also had to take my shoes off to enable me to stay afloat, so the first day I spent on shore found my feet cut and blistered and very tender. Lacking shoes, I made a pair out of my life jacket. On the fifth day after landing I found good drinking water but was forced to vacate when the Japs made a landing close-by. During the first five days I drank water from old cocoanut halves and what little I could find in old stream beds. The fourth day I found an old door from a plantation house and with a life preserver made a raft, but was unable to launch it that night because of a storm or the next night because of a Jap landing party. While waiting for nightfall these days, I made several attempts to skirt the Jap positions but was unsuccessful. My food during this time consisted of coconuts, lemons (I had carried a dozen with me), and snails.

"During the ensuing two weeks I made repeated attempts to skirt the Japanese positions without success and was becoming weak from my diet of coconuts. My feet were in very bad shape, being cut, blistered and festered. Later, I found some Jap shoes but was unable to wear them because of the pressure they placed on the sores. My life preserver shoes wore out so I made some more out of discarded rags I found. Even though I slept on the ground and in rain several nights, I at no time during this period felt that I was physically sick, even though I realized that I was weak.

"I decided to try to get to the natives. But, after walking one day, I sighted what I thought to be one of our destroyers coming down the coast. Making a raft out of logs, I swam toward the ship but had to return to shore after finding that it belonged to the enemy.

"Using this same raft I swam down the coast that night until I was forced to re-

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turn to shore by the cold. I then returned to the position from which I had sighted the destroyer, as I had found good drinking water there, and filled my water bottle. I found an old native canoe, which I fixed, and decided to paddle around the Jap positions. For the next three nights I paddled about three hours each night, or until I became exhausted. By doing this I skirted the Japs. On the third day and from then on until I reached the natives, I found food to be plentiful, having bananas, eggs, papaya and coconuts. After three more nights paddling I reached the natives. This was twenty-five days after I was shot down.

"Upon arriving on shore I collapsed from exhaustion and the natives all ran from me, but after I shouted at them in English they returned and were very friendly. My feet at this time were in very bad shape, so they carried me to their camp where I was fed very well with baked bananas, papaya and fish.

"During my entire stay in the jungle I at no time felt sick or feverish, even though the flies, mosquitoes and ants were very bad. The flies and ants bothered me the most as they were very annoying on my feet. My reaction to the fear of the Japs changed. At first, when I was in the water trying to keep out of range of the patrols on the beach, I had a much greater fear of them than I had after the two weeks I spent dodging them in the jungle. I had several face to face encounters with them but felt no great fear. At only one time, after I had been on shore about two weeks, did I feel that I was going to starve, or catch malaria and die before I got out. At this period I was badly in need of food. After finding the canoe and getting around the Jap positions and finding plenty of food my spirits rose. The reason that I was unable to secure more food while I was among the Japs was because of the fact that they had eaten all the fruit and game as they moved, leaving very little behind that could be eaten."

Luck? Hardly. Lieutenant Leslie's survival experience was the result of good Navy instruction, plus his feeling that he was prepared for anything that might turn up.

In surviving jungle and Jap, our men have learned many tricks. They have discovered, for example, how to squeeze oil out of the coconuts to oil their guns; they know always to wear all the clothing they have when on the water as protection against both sun and cold; they have made sunburn preventative out of burned coral and shell mixed with water; they improvise signaling devices out of bits of metal; they have found pure drinking water in gnarled vines; and they have used the ever-present coconut for food, drink, physic, and shelter (one could devote an entire book to telling the part the coconut has played in the Pacific war). Above all, these men have eluded and fooled the prowling Jap. Despite the Jap's vaunted prowess in the jungle, Americans are only a few generations removed from Indian fighting days.

Lieut. T. H. Mann, Jr., another Marine Corps pilot at Guadalcanal, made a forced landing in the water after shooting down three Jap bombers, the third of which exploded under the nose of his plane, knocking out his engine.

"In the water landing," Mann reported, "my face struck the gun sight on impact, knocking out two lower front teeth. I must have been knocked unconscious because the first thing I remembered was that the cockpit was full of water. When I got out and came to the surface my plane had completely disappeared. I found the Jap bomber making a strafing pass on me. I dove and swam under water away from the oil slick. Coming up the second time, I found the enemy plane turning to make another strafing attack. I dove under water again and upon coming up found the enemy plane proceeding to base. I started swimming toward one of the islands which was from 10 to 15 miles distant. After swimming some distance and looking back I found my rubber boat. Spent 15 or 20 minutes trying to get into the boat from side and front. After taking off all loose gear and shoes, I got in from the back.

"Had quite a bit of shock due to the teeth being knocked out and the shrapnel wounds. After treating the wounds as best as I could with my own first aid kits, using sulfanilamide, sulfathiazole powder and taking aspirin, quinine and salt tablets according to instructions, I spent approximately four hours rowing to one of the small islands.

"Arriving 100 yards off shore I found two native canoes behind me coming from an adjoining island. They took me to the shore where they gave me food, hot water to wash wounds, and rest. After resting they took me to their native village on another island about 15 miles away. Upon arriving at the village they wrapped me in blankets (Marine Corps issue), and fed me hot tea, again dressing my wounds and giving me more food. My wounds were first scrubbed with soap and water; sulfanilamide powder was then applied and I was bandaged. These were from my first aid kit.

"This village numbered about 100 men, women and children. Three men could read, write and speak English. About an hour after arriving at the village I began to get over the shock from which I was suffering and the rest of the afternoon was spent in telling the villagers about the war and stories about America. The natives seemed very interested in when the war would be over in their islands, asking if it would be finished by Christmas. They informed me upon arriving that I would be returned the following day. The natives gave me a bed, blankets and mosquito netting (Marine Corps issue). My food for that night consisted of sweet potatoes, a native root similar to potatoes, ripe pineapple, a can of pears, papaya and more hot tea with sugar.

"The next morning I awoke feeling much better. They had hot water, soap, a Prophylactic tooth brush and Ipana tooth paste. For breakfast I received more pineapple, papaya, fried eggs, and French fried potatoes, hot tea and sugar. My shrapnel wounds were giving me no pain or irritation although I had a solid dull ache in my lower jaw where the teeth were knocked out. I took some more of the medicine from my kit, consisting of aspirin, quinine and salt tablets. I did not dress my wounds as I was out of sulfanilamide powder. At approximately 7 a.m. they were ready to take me back. This trip of about 45 miles was made in an 18-man war canoe. All during the trip the natives rowed constantly, pausing occasionally for food. We arrived at about 5 p.m. The natives were given *large* amounts of issue foods to take with them to their village. This consisted of tins of sugar, salt, coffee, tea, and cartons of meats and other canned rations. The natives gave me large amounts of taro root (potatoes), sweet potatoes, and several papayas and pineapples to take with me. I gave the natives my hunting knife, compass, clothes, helmet and goggles upon their request."

In another case, survivors from a *Catalina* that was shot down off one of the wild coasts in the Netherlands East Indies made their way back to Melbourne, Australia, under inconceivable conditions. It took them from February 5 until May 22, and included a 26-day sea voyage during the monsoon period to the coast of New Guinea in a native canoe.

Survival on the open ocean is a tougher proposition than land survival. While there is a greater element of luck, chances of survival are still in pretty direct relation to the will to come through—plus a supply of drinking water. A man can live only eight to 12 days without water but survivors have made out all right after 21 days without food. The known record for survival at sea was set by a Chinese seaman who lived 133 days on fish and rain water and still was in good enough shape to walk ashore when rescued. The Navy has now developed kits which provide safe drinking water for castaways.

Men who are forced to wrest their existence from sea and sky no longer need put their entire reliance on mechanical and tabular aids. We have long since learned that primitive peoples were able to voyage over large areas of the world without any such devices. Study of these primitive methods shows that there are many valuable aids that we have long neglected or forgotten. From ancient lore as well as from its own store of practical experience, the Navy has derived the simple skills which enable one to survive perils of the sea.

In addition to its educational program, the Navy has greatly augmented survival equipment since the start of the Pacific fighting. Every pilot taking off from a carrier or an advanced land base now carries a standard emergency kit which contains the following items: instruction book, signaling mirror, heavy cord, fishing kit, whistle, knife, pyrotechnic pistol and cartridges, sunburn ointment, poncho, gloves, sharpening stone, magnifying lens, preservative, first aid kit, rations, match-box compass, salt tablets, adhesive tape, safety pins, mosquito head net, and cans of water. Not as bulky as it sounds, the pack is used as a back rest or seat cushion in flight. But most important, it provides a wonderful start for setting up housekeeping on some lonely beach—or even in a rubber boat. END

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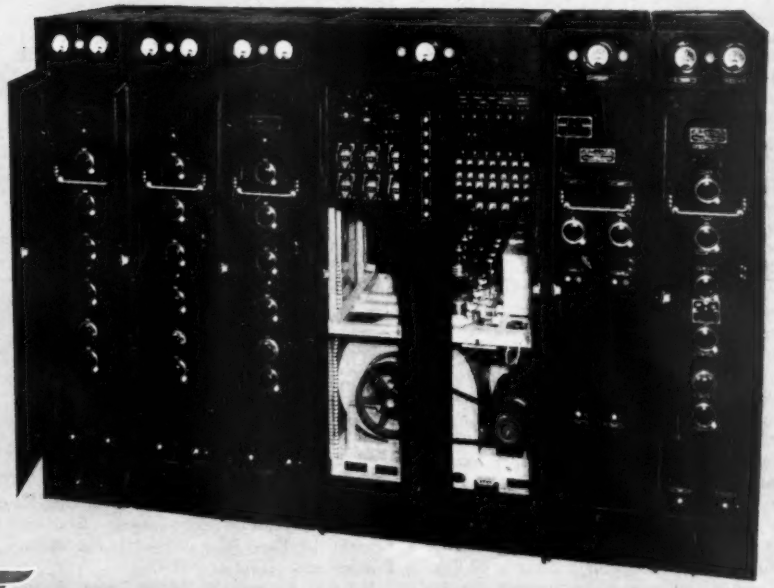

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NATS

(*Continued from page 105*)

rapid growth, safety has always been the keynote of NATS operations. The cargo is always of high priority. It is always needed somewhere quickly. Mail or medicine wanted in the Marshalls, or a Pratt and Whitney engine destined for a *Ventura* replacement job in Paramaribo will help nobody if it gets tangled in treetops at Tallahassee, Fla. There have been some mishaps, of course. But if you take the safety records of all the air transport services throughout the world and stretch them end to end, the NATS safety record would still be outstanding.

The kind of safety record enjoyed by NATS is not merely the result of a directive charging all hands to operate with prudence. The result springs chiefly from three main sources: training, organization, and high morale of flyers and ground crews.

The pilots are selected from the Naval Aviation Training classes at Pensacola or Corpus Christi as soon as the cadets are commissioned in the Naval Reserve. Effort is made to choose only those who are temperamentally fitted for the long, unadventurous flights so frequently required of transport pilots. Steady hands and cool heads are required.

The first specialized training step is a thorough course in instrument flying at the Naval Air Station in Atlanta. Here the future pilot becomes so familiar with the instrument panel that he begins to think he can fly the Alaskan fogs and the Caribbean tropical fronts as well as any old timer on the circuit. Much of this confidence comes to the youngster because the bulk of his training is done on a Link Trainer which enables the student to make serious errors in judgment of distance, direction, and altitude, and live to finish the course.

The next step is instruction in flying multi-engined planes under air-wise pilots of American Airlines at Fort Worth, Tex., or of Pennsylvania Central Airlines at Roanoke, Va.

From the multi-engined plane schools they are sent to Olathe, Kans. This school, operated by VR-3, has plenty of up-to-date equipment and instructors. The equipment includes almost everything from Link Trainers to four-motored transport planes.

Among the instructors are:

Jack Horner, an old Braniff Airways pilot who was flying cargo to Panama under a Braniff contract when the war started; Barney Capehart, who, in addition to being a long-time transport pilot [and former advertising manager of FLYING], had enough showmanship in his makeup to attract national attention by m.c.-ing the Cleveland air races; Al Olson, who was flying his own transport service in Colombia when the war came along.

Capt. D. F. Smith, USN as Director of NATS is under the Deputy Chief of Naval Operations (Air) and under him are: Captain C. H. Schildhauer, USNR, Assistant Director in charge of Plans and Logistics and formerly with Pan American Airways, who even before Pearl Harbor had begun the organizing of Naval Air Transport Service and whose vision is responsible for much of its development; Comdr. Paul E. Richter, USNR, Assistant Director for Operations and a former TWA vice-president, who has as operations officers two former airline men, Comdr. C. F. Luethi, USNR, (Northwest Airlines), and Lieut. Comdr. K. F. Lueder (Pan American).

Commanders of the three operational wings are: Capt. C. K. Wildman, USNR, formerly with the Sperry Corporation and the first commanding officer of Naval Air Transport Squadron One (VR-1), has command of the Atlantic Wing; Capt. James E. Dyer, USN, long prominent in Naval aviation, is commanding officer of the West Coast Wing; and Capt. D. W. Tomlinson, USNR, one of the Navy's outstanding pilots, leader of the three Sea Hawks and former TWA vice-president, is in command of the Pacific Wing.

Commanders of the various squadrons, many of them well-known in the airlines, their routes and equipment are:

ATLANTIC WING

VR-1. Comdr. I. E. Sommermeyer, USNR, formerly United Air Lines. Routes: Argentina to Miami, Patuxent to Bermuda, Patuxent to Port Lyautey, Africa. Equipment: R4D and R5D.

VR-6. Comdr. H. R. Canady, USNR, formerly Pan American Airways. Route: Miami to Natal. Equipment: PBM.

VR-7. Lieut. Comdr. S. W. Hopkins, USNR, formerly Chicago and Southern Airlines. Route: Miami to Montevideo. Equipment: R4D.

VR-8. Comdr. J. C. Toth, USN, one of Navy's most experienced patrol plane skippers. Route: Patuxent to Natal. Equipment: PBM and PB2Y-3R.

VR-9, under the Atlantic Wing. Comdr. J. C. Heist, USNR, formerly of VR-1, VR-6 and VR-7, commanding. Acts as maintenance and service squadron (non-operational) and administers stations in the Atlantic Wing through officers in charge, or Air Transport Officers at the several locations.

WEST COAST WING

VR-3. Comdr. V. A. Dorrell, USNR, formerly in charge of operations, Midcontinent Airlines. Routes: New York to Oakland, Olathe to Jacksonville. Equipment: R4D.

VR-5. Comdr. H. C. Hollenbeck, USNR, formerly Western Air Lines. Routes: Seattle to San Diego, Seattle to Attu. Equipment: R4D and R5D.

VR-4. Under the West Coast Wing, Comdr. K. B. Haugen, USNR, formerly Northwest Airlines, commanding. Acts as maintenance and service squadron (non-operational) except for specific flights.

PACIFIC WING

VR-2. Comdr. W. N. Nation, USN, one of Navy's patrol plane veterans. Routes: Alameda to Auckland, Honolulu to Kwajalein, Honolulu to Manus, Admiralty Islands. Equipment: PB2Y-3 and PBM.

VR-11. Lieut. Comdr. W. F. Peterson, USNR, formerly of TWA. Routes: Oakland to Manus, Admiralty Islands, Tutuila (Pago Pago) to Tarawa. Equipment: R4D and R5D.

VR-13. Comdr. J. W. Thornburg, USNR, formerly of TWA. Route: Sydney to Manus, Admiralty Islands. Equipment: R4D and RY (transport version of *Liberator*.)

VR-10. Comdr. E. A. Von Adelung, USNR, and VR-12, Comdr. M. L. Hoblit, USNR, formerly of TWA, act as maintenance and service squadrons for the Pacific Wing (non-operational).

While the organization is broken down into squadrons, it actually is one closely-knit operating unit. The squadron formations are merely for administrative and geographical divisions. Actually, all squadrons are playing on the same team. This goes for the maintenance and loading crews and the administrative officers as well as the pilots and aircrewmen.

Major consideration of the service is moving high-priority cargo. Personnel transport generally gets second consideration, although NATS has transported the Secretary of the Navy, high ranking officers, specialists, men returning for emergency leave, and wounded. The primary object, however, is moving cargo.

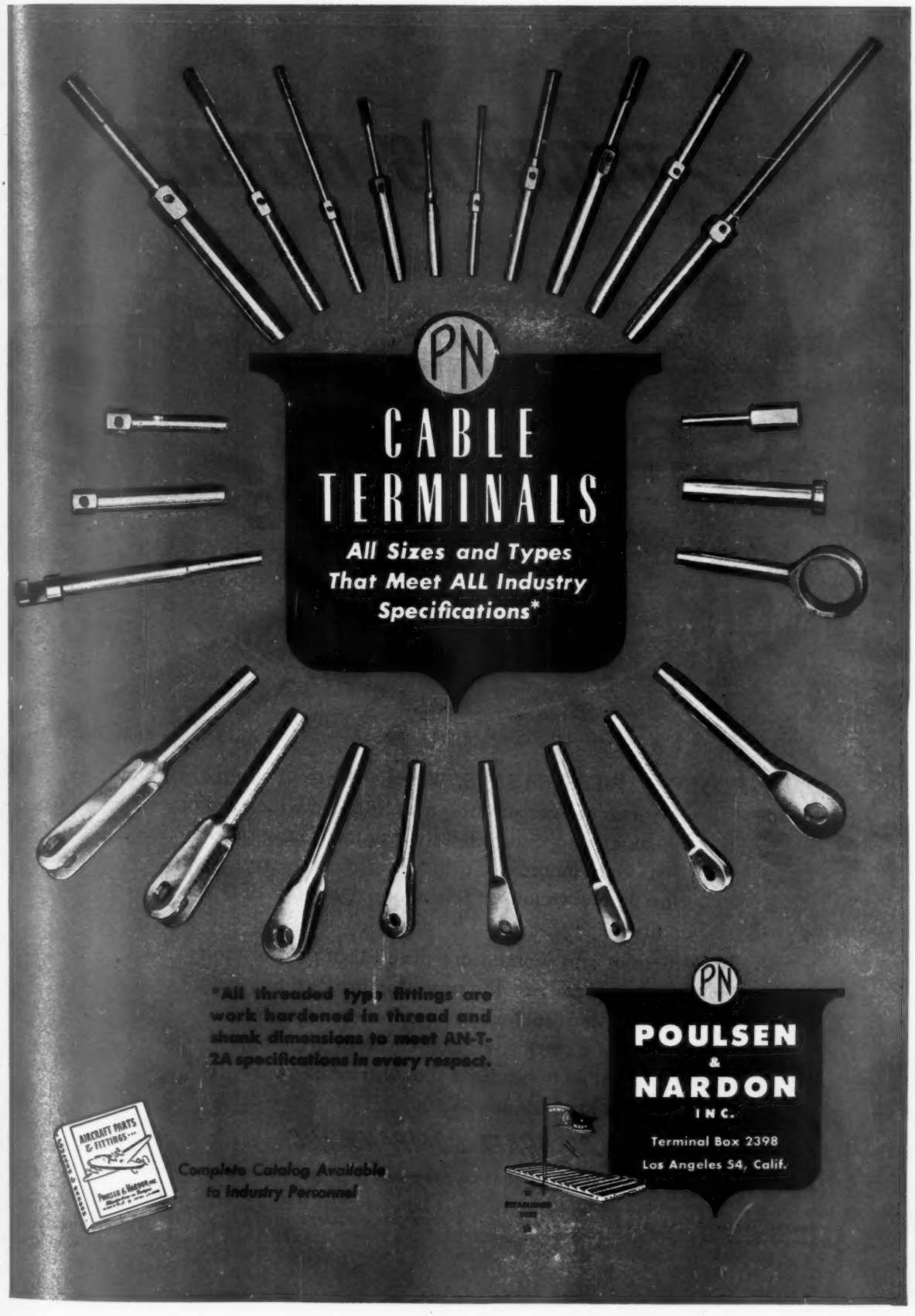
As for the handling of personnel, NATS is a wartime creation. War was never noted for making its followers comfortable. In this respect, NATS has more than followed the lead of Mars. Personnel who have ridden sideways for thousands of miles in its uninsulated cabins are convinced that the designers of the bucket seats and the protruding bolts and lugs slightly overdid it.

"The purpose of NATS," said a loading officer at Zendery Field, Dutch Guiana, "is to get cargo and men from one place to another in good shape. And what's wrong, pray tell, with the shape of a bucket seat?"

Regardless of his opinion about what a bucket seat will do to a man's morale (the anatomical distortion will readjust itself, experience has demonstrated), the loading officer is an important official at any landing field. Vast experience has brought the business of loading a transport with miscellaneous cargo to an exact science. In this work, the loading officer is assisted by the flight orderly—an enlisted rating devised for a specialist who rides the transport and whose duties in a general way coincide with those of a steward on a commercial liner.

Airplanes never were loaded in a haphazard manner; always there has had to be a delicate balance of weight around the plane's center of gravity. But a slide-rule load adjuster now takes the place of the old-fashioned table of weight-distances. Patented adjustable cargo clamps have largely replaced the old rope lashings which hold the cargo rigidly in place. Long experience has enabled the loading officer and crews to load the plane with exactness, to secure the cargo firmly, and to employ the minimum space for cargo. Cratage weights have been reduced to the

(*Continued on page 240*)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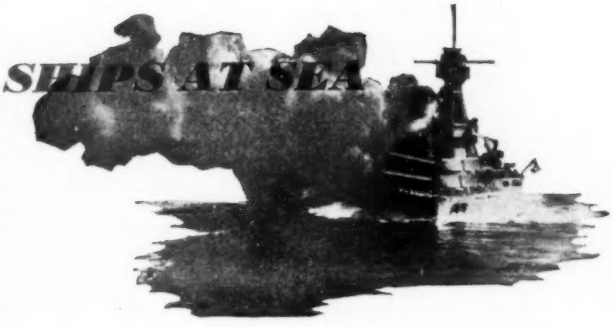

in the oil fuel tanks deep in the bowels of a loaded ammunition ship—two other loaded ammunition ships alongside at an Army pier in Jersey City.

YET — fire fighter crewmen from the Navy and the Coast Guard with FOGNOZLS and FOGNOZL EXTENSION APPLICATORS confined the fire with WATERFOG allowing the ship to be towed to sea and scuttled—*not a single life lost.*—The Saturday Evening Post, May 13, 1944.

ON THE HOME FRONT... FIRE!

—a plane taking off at a metropolitan airport — crashing into four other planes—all fully fueled with 100 octane gasoline—and then skidding into a hangar, a frame store room piled high with wooden motor crates—

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—Location and details withheld under military censorship.

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(*Continued from page 236*)

minimum and packaging has been developed to great efficiency. NATS has played some part in almost every improvement in air transportation.

NATS operates on strict Naval procedure. Like any other huge organization, NATS has its basic rules and basic interpretations of these rules so that an efficient uniform service may be maintained throughout the establishment. Even before the organization was officially established by order of the late Col. Frank Knox, two reserve officers were called in from commercial airlines and work was begun by them on the basic NATS manual—a volume of regulations which has grown in three years from a few brief pages to a book the size of an unabridged dictionary. Even the brand new NATS ground officer, if he is patient enough to hunt through the manual, will be able to act according to law and customs in the most complicated situation. One young officer, fresh from indoctrination school, took over a NATS station at a tropical littoral. He ran into numerous small troubles at once.

"I've got a monkey here and I love him like a brother," protested one passenger, a young petty officer. "He's more than human—why human beings are out right this minute shooting each other up and hating each other. Now Jocko wouldn't hate anybody. Would you, Jocko?"

But Lieut. Roy Green, lately of New Orleans, was adamant. "It says here in the regulations," he declared, "no pets and no small animals. That's what it says, and that's what is means. The monkey can't ride."

"Have a heart," pleaded the passenger, almost with tears in his eyes. "Jocko's my friend. I been under fire with him. I can't stand to be separated . . ."

"It says here," repeated Lieutenant Green, "that pets and small animals do not ride. If you can't stand to be separated from Jocko, you may stay here with him. The regulations say monkeys do not ride NATS."

The passenger thought it over a minute. "I've got a good mind not to go back at all."

But he slowly unbuckled the little collar around Jocko's neck. "You're on your own, kid," he said, releasing the pet.

The loading proceeded. Green checked weights and operated the slide rule. The flight orderly supervised the placement and the securing of the cargo.

"Hey, Mr. Green," the flight orderly called, abruptly. "What about this parrot?"

"No soap," said Green. "Answer is alway the same. No pets. Throw it off."

"But it's the admiral's parrot," suggested the flight orderly.

"Regulations say no pets, no small animals, no live ammunition—wait a minute, whose parrot?"

"The admiral's. He's sending it to his granddaughter—"

"Hold everything," ordered Green. "Let's see those regulations again. I wonder if that parrot is either a pet, a small animal, or live ammunition."

He looked at the flight orderly. "No, it won't work. Regulations are regulations; they're same for admirals as for everybody else. That parrot can't ride on this plane."

The flight orderly looked worried. "Maybe you had ought to send back a message asking for special permission, lieutenant," he suggested. "After all, an admiral is an admiral."

The plane took off, and the admiral's parrot remained behind. But not for long.

As soon as the transport cleared the field, Lieutenant Green picked up the parrot cage, wandered over to the area used by the Army and sought out a young major friend from New Orleans who was piloting a *Liberator*.

"*He' le bas, Emile!*" he greeted, in his best Louisiana French.

"*Com' ca vas*, Roy?" returned the major. "Boy, am I goin' home this time, yes! Ten days' leave. Boy, I'm doing all the good things. Gumbo at Broussards, pompano in a paper bag at Antoinine's, shrimp at Arnaud's—"

After some good New Orleans talk, the Naval officer got around to the real point of the conversation.

"Look, Emile," he said. "I've got a parrot I'm sending back to a little blonde in Miami Beach. You know how much mess there is through customs and all. Besides, we don't have a direct flight—have to go all over the islands . . ."

"Sure, I know, Roy," said the major. "Give me the parrot and the blonde's address. I'll tell her you sent it."

Green laughed. "Just give it to her. You needn't mention my name. She'll know—and the address is on the cage."

As the major, grinning, turned to go, Green called out suddenly. "Oh, by the way, Emile, I've got a monkey here, belongs to a friend of mine. He thinks the world of that monkey and I wondered if maybe you would . . ."

"O.K., Roy," said the major. "Anything else? Any giraffes, kangaroos, boa constrictors?"

"That's all. I'll send them both around. Pleasant trip."

And so—as usual—NATS got results. The admiral's granddaughter got her parrot, the young man got his monkey, and NATS kept to the regulations. What the Army did, of course, is strictly the Army's business. END

Lighter-Than-Air

(*Continued from page 126*)

Lighter-than-air has outgrown its mother base at Lakehurst, New Jersey Time was—and not long ago—when LTA and Lakehurst were bracketed together in the minds of people just as are ham and eggs or arsenic and old lace. Today, Lakehurst still is the center of the operations. Rear Adm. C. E. Rosendahl is Chief of Naval Airship Training and Experimentation headquarters at this station. In addition to directing the training and experimentation of the LTA's expansion program, Admiral Rosendahl is, perhaps, the world's most enthusiastic proponent of LTA as America's post-war commercial air vehicle. He points out constantly the advantages of this kind of air transportation, and then makes the argument doubly strong by calling attention to America's unique situation in having control over the entire helium supply of the world. LTA activities have already been widely extended. From Maine to Montevideo on the Atlantic coast, and at strategic spots along the Pacific coast, these big sausage-shaped bags can be seen floating in the sky, searching and observing. The Navy now operates nearly 150 of these new type blimps, and has more coming from the constructors.

Anti-submarine patrol work has been especially hazardous since the enemy switched his tactics to include antiaircraft firing from the decks of the submarines. This antiaircraft comes from guns designed and crews trained to operate against swift-moving, streamlined airplanes. After being prepared to fire against a sleek *Avenger* that dives and jinks in at more than 200 m.p.h., shooting a blimp that looks as big as a cumulus cloud is like shooting fish in a barrel. However, bombing runs have been made by blimps and, on occasion, blimps have evaded the antiaircraft fire.

But bombing submarines is not the most effective things the blimps do in the anti-submarine war. Observing, spotting, getting out in all sorts of weather when airplanes are grounded, pacing itself to the speed of the slow-moving surface ships it is convoying, getting into and out of places where no other kind of aircraft can operate—these are the things that make the blimp an invaluable member of our aviation team.

Their long hours of search frequently produce nothing. Occasionally, when they do produce, a scant paragraph tells about it. Here is the official report summarized for the *LTA Newsletter:*

"Detachment 2 was inaugurated by the K-36 on January 7 on the occasion of a special search for enemy survivors of sunken blockade runners. The first flight lasted approximately 23 hours, with the ship landing at a base where it was serviced. Changing crews, it returned to the search, landing that evening at Detachment 2. The first flight was very successful and over the period of the search, which lasted several days, blimps operating from the aforementioned bases, plus some from Detachment 1, recovered approximately 75 per cent of the survivors."

Considering that 75 per cent of the survivors were picked up, the announcement is couched in remarkably restrained language. Riding for 23 hours at a stretch over the South Atlantic in a weaving gondola is rugged work in anybody's war. The search was for survivors of three Nazi blockade runners that were hunted

(*Continued on page 244*)

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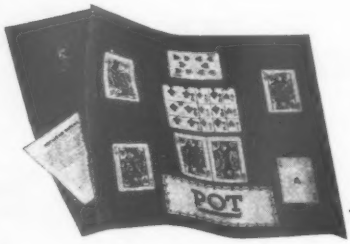

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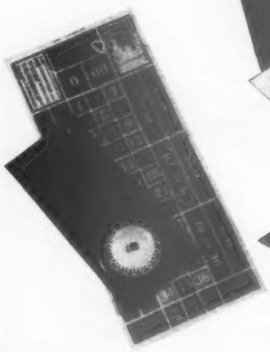

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ARMY E NAVY

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(*Continued from page 240*)

down by a squadron of Navy *Liberators*. In addition to the 75 per cent rescue record, the blimps also picked up tons of valuable crude rubber that floated when the enemy ships went down.

Another squadron has distinguished itself in picking up personnel in a rescue operation. A Coast Guard cutter had foundered and sunk in a night storm off the Jersey coast. Next morning, a blimp under the command of Ens. Walter Bjerre took up a search of the area. Ens. Harry S. Cook, Jr., on the rudder, spotted a blob in the water, and almost at the same time, Lieut. William H. Taylor, Jr., on the elevator, saw another such object. Closer investigation revealed that what Cook had seen was a life raft with 10 men on it; the other object proved to be three life rafts lashed together, with 26 men aboard. Bjerre stood by, flashed the information back to the station, and waited until surface vessels picked up the crews of the sunken ships.

A few days later, Ens. H. E. DeVore, of the same squadron, in an all-day patrol located 21 bodies of men who went down on a Naval patrol ship—formerly a luxurious yacht. The patrol boat had sunk 60 miles off Cape May, after a collision with a merchant ship. The first victim sighted by DeVore was fouled in an overturned liferaft. DeVore notified surface craft and guided them to the position. A short time later 12 more bodies were found and surface craft were guided to them. That afternoon an additional eight were recovered.

The northern coastal region of Brazil is a delightful-looking area from the air—broad patterns of green, carpety grass dotted here and there with *nipa* villages and coconut palms. Occasionally an aviator in trouble will pick out a nice grassy looking strip in which to set his plane down. This, in northern Brazil, is an error of judgment. Almost invariably these trim looking meadows—they look like good pasture land from the air—prove to be slimy, stinking swamps with dank, fetid tropical vegetation floating on top. Anywhere from a few inches to several feet of water lies under this green carpet, and beneath the water is usually soggy mud. It is not an ideal natural landing field.

However, the natives are friendly and co-operative and frequently able to render effective assistance, provided there are any natives available. Two flight officers of the Royal Canadian Air Force, Doherty and F. B. Clarke, recently bailed out of their airplane not far from the mouth of the Amazon River. Their plane had failed because of engine trouble, and the two flyers parachuted rather than attempt a landing.

For two days the two Canadians wandered through the swampy jungle, and for two days a group of natives who had seen them parachute down, wandered through the same jungle, searching for them. Finally they all came together. The natives took the officers in, fed them and bedded them down. Then the flyers spread their parachutes on the ground, hoping to attract the attention of any passing rescue plane.

Not long after this, a Navy *Ventura* on patrol, spotted the parachutes and circled low, but decided the hazards of landing were too great. But they notified the lighter-than-air base that two flyers were down at a certain village.

Next day a big K-type blimp, commanded by Lieut. James N. Davis, USNR., arrived over the village. He dropped a smoke bomb to observe the direction and force of the ground wind and eased down to a wheel landing. The wheels promptly sank to the hubs in the mud, without causing any appreciable damage. The flight officers had to walk only 50 feet to board the blimp.

Six days later the same blimp, commanded by the same pilot, rescued seven army flyers who had gone down in the jungle. The two *Mitchell* bombers they were flying had crashed. On this occasion, Lieutenant Davis was assisted by another blimp of his squadron. As soon as the downed flyers were located, one of the blimps swooped low in a slow run near the ground, and Boatswain John Francis Desmond dropped off from a rope ladder. Within 15 minutes he had organized the boarding party, had cut down some particularly tall bushes that would interfere with the blimp's maneuvering, and had put the downed Army flyers on the low-flying blimps. Four separate landings were required to take the entire party aboard.

The Navy's LTA, as might be imagined, has the respect, admiration and co-operation of the Army in the areas in which it works. Many gratuitous letters from local Army commanding officers to blimp squadron commanders indicate the general feeling about the work of this branch of the service. On at least one occasion, the Army demonstrated its attitude in a more practical way.

A blimp of another squadron headed for the South Atlantic area under the command of Lieut. Charles C. Newman. It had expected to tie up at an Army air field at 7 o'clock in the morning, and arrangements for handling it already had been made. However, a tail wind shoved the crew along, and they arrived at 3 a. m. Due to long range communication difficulties, they were unable to signify a change in their expected time of arrival until after 1 o'clock, leaving a very short time for the Army personnel, inexperienced in this kind of work, to get ready for the landing.

Upon coming to the vicinity of the field, Lieutenant Newman asked the tower when he could expect help to land.

"We are ready now," came the reply—and they were. Having made elaborate preparations the evening before, the soldiers pulled the blimp ropes and secured her "without incident," as the report so modestly puts it.

Blimp crews never know what their missions are going to develop. One blimp operator spotted a life raft floating in the vicinity of the convoy he was patrolling and immediately set about the usual rescue. After a lot of work, however, he discovered that the raft had been put over the side of one of the ships on purpose and that the situation was under complete control.

Another time a blimp flying in really tough weather off the Florida Coast spotted something on the water's surface below. Investigation revealed the object to be a boat, in which sat a man.

"If you are in distress," megaphoned the blimp skipper, feeling that this was another false alarm, "raise an oar."

Immediately the man in the boat raised his oar. The blimp stood by, and signalled the base. An hour later a Coast Guard boat came along and picked the lonely mariner up.

According to his story, the man had been fishing off shore in the row boat. When he got ready to return he found wind and current against him too strong, so he anchored and went to sleep. When he woke up, he found that his anchor line had parted and he had drifted out to sea. He had been away for 30 hours when the Coast Guard rescued him. This unfortunate fellow received the final crusher when the FBI jailed him for staying out at sea all night without permission of the Coast Guard—a necessary wartime precaution.

On one occasion the Army asked for lighter-than-air aid in searching for a *Liberator* bomber that was overdue and believed to be down in Dutch Guiana. Lieut. A. M. James was in command of the blimp that made the search. After hours of fruitless hunting, the crew passed over a small village and noted that the natives were making frantic signs to them. When the village chief saw he was being observed by men on the blimp he began pointing toward the canal and making violent gestures with his hand. The ship went in the direction the chief pointed, saw nothing, and then circled back to the village.

This time the chief made signs that unmistakably indicated a crash. Ens. R. C. Bywater, co-pilot of the blimp, dropped a piece of paper on which he had drawn a picture of a plane crashing into the jungle. The native response to this was noisy enthusiasm, after which the chief lighted several matches, which Ensign Bywater took to mean that the plane had not only crashed but burned.

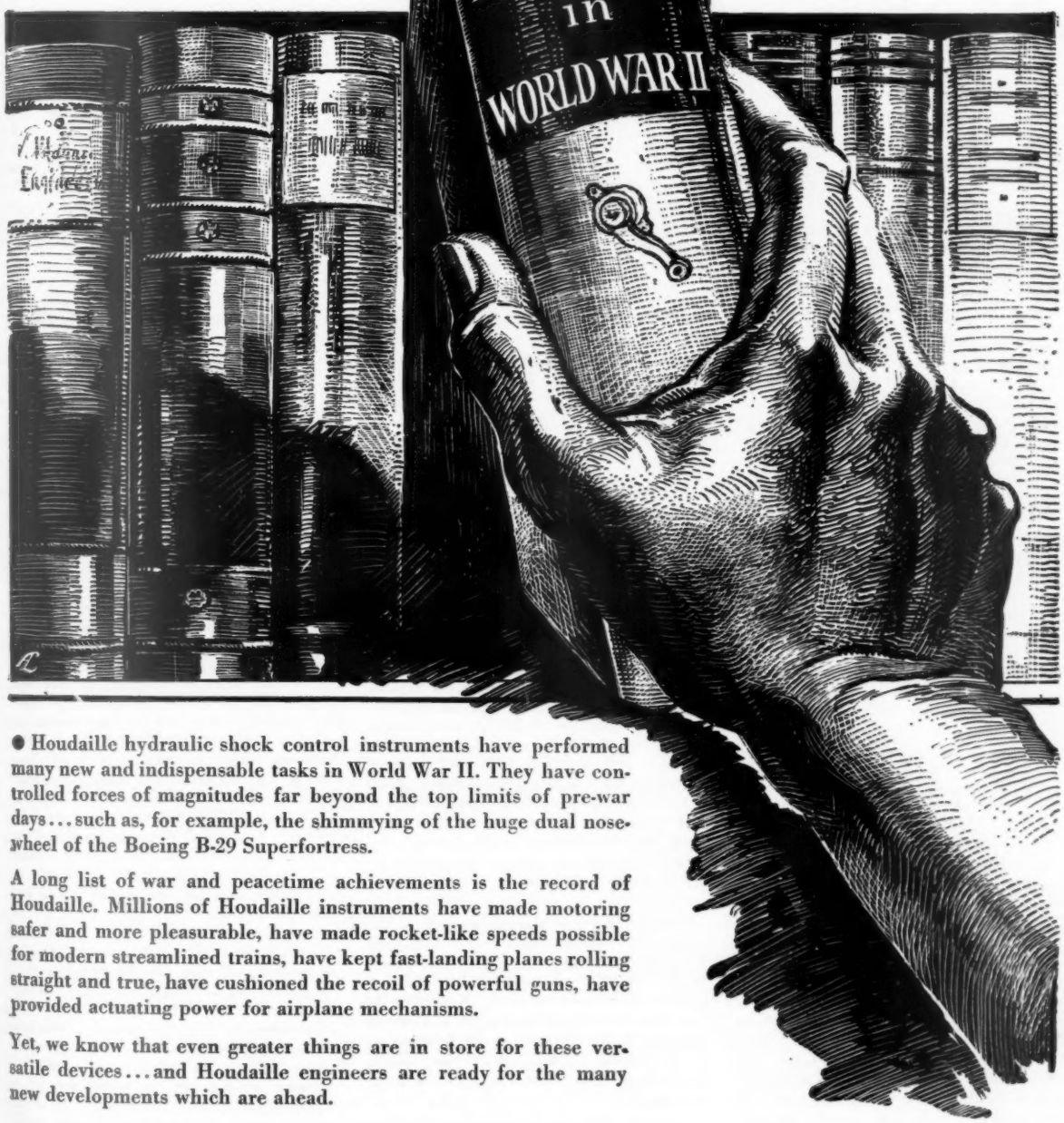
Convinced they were on the right track, Lieut. James made a slow approach and dropped Ensign Bywater near the village for further investigation. The natives could speak no language that Bywater could understand, but he gathered from further and more detailed signs that the plane had indeed crashed and burned, and that there were no survivors as far as they knew.

This information, however, did not satisfy Army headquarters, so the following day the blimp returned to the village with an interpreter.

"It was not an airplane at all," the interpreter explained later. "What they had seen was a submarine—a real German submarine—cruising leisurely down the canal. A big white airplane dropped fire on it; everything was fireworks, much explosion and much smoke. The submarine went away, the airplane went away, and nobody was hurt."

Just where the big white airplane came from remains a mystery. The Army plane was never found.

HYDRAULICS' BIGGEST STORY



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Life On a Carrier

(*Continued from page 152*)

produces from powder a drink surprisingly akin to the natural product. A soft drink machine will probably be available in the wardroom and there will also be plenty of coffee, fresh fruit and candy for a between-meals snack. For beer or a cocktail, the flyer must wait for a trip ashore.

Boredom is one of the carrier pilot's greatest enemies during the period of comparative inactivity while his ship is at anchor or on its way to or from a strike. Reading, playing cards, writing letters and talking occupy most of his shipboard hours. On his way back from a strike, however, he may spend a good deal of time recovering physical and nervous energy by sleeping.

In the Pacific area he may go to the wardroom lounge after dinner and hear a radio broadcast from the Pacific coast or Honolulu, or to listen to "Tokyo Rose," a Jap female artist whose music he enjoys and whose propaganda he finds amusing. When conditions permit, movies are shown on the hangar deck each night. Usually these are quite ancient unless the ship is in port but most of the men will go to see them anyway—even for the second or third time, because movie actresses remind them of women at home. He has "pin up" girls in his living quarters for the same reason. Movies on shipboard or at an advanced base, often bring odd reactions. Films which invite an audience to join in a "community sing" generally get little response at home but on some ships they are likely to draw loud applause with all hands joining in enthusiastically. On other ships the reaction might be silence or worse.

Shipboard movie audiences laugh uproariously at even the feeblest joke unless it concerns the "hardships" of the civilian front. Frequently they find delight—and double-meanings—in lines not intended by the script-writers to be funny. War pictures, with their phony heroes, are not appreciated; in fact they are seldom shown.

Card playing—bridge, poker, acey-deucey, black-jack, cribbage, rummy, or one of the many varieties of solitaire—passes many hours for some. Practically all the flyers—particularly those who joined the Navy at a time when college training requirements were high—spend a great deal of time reading. For many this is the chief diversion. The quality of books found in the average carrier or squadron library would delight almost any college English professor. Conversation in ready room, bunk room, and stateroom is likely as not to deal with the enthusiasms of a flyer over a new book discovery. Aircrewmen also find diversion in reading and while their average taste in literature might not be pleasing to the professional educator, it frequently is very high. A peep over the shoulder of a 19-year-old crewman deeply absorbed in a book revealed, for example, that he was reading Strindberg's plays. The classics and better quality of contemporary fiction and non-fiction are greatly in demand; but the adventure magazines and cartoon books are also heavy favorites in the crew ready room.

Writing letters takes up a good deal of your Naval airman's time. He likes more than anything else to get letters and he hasn't yet thought of any way to keep on getting them without writing answers. The problem of finding something to say is complicated by fairly rigid censorship restrictions. For example, he cannot describe in detail his current and future flight activities. For days and even weeks at a time a ship may be where it can neither dispatch nor receive mail. Returning to a mail-receiving point is therefore a great event, except for those who suffer the disappointment of getting no mail or the wrong kind of mail.

The atmosphere in the bunk room, the ready room, or the wardroom lounge is much like that of a college men's dormitory or fraternity house—an extremely crowded one. In the bunk room, where the younger pilots live, arguments are frequent, sometimes noisy, but they are almost always good-natured. A close observer who hears a furious heated discussion may find that it deals with such a weighty professional problem as "whether a fly, lighting on a ceiling, does an inside loop and a stall in order to land there or does an outside loop and a half-roll." Pilots exchange a great deal of serious professional information in their talk sessions and they let off a good deal of steam. They "ride" each other severely, much as old friends do, but are extremely considerate at times when nerves are taut and tempers on edge. Strained relationships between men whose lives depend on each other's actions are intolerable. Boys who may be proud of "not having to take anything from anybody" in civilian life, will smilingly accept almost any remark from a fellow flyer known to be nervously on edge. The habitual complainer or trouble maker is a rarity. These fellows seldom reach the combat zone and if they do they either reform or are detached as soon as it can be arranged.

Whether he was reared on one of the coasts or in the middle west a thousand miles from salt water, your carrier-based airman feels much more at home flying over water than over land. Normally he would prefer taking his chance of a forced landing in the water to crash landing on rough terrain ashore. Most Navy pilots would even rather bail out *near* the land, coming ashore in a life raft or by means of a Mae West life jacket, than to take their chance on injury by coming down in trees or on rocks on land. The amazingly high percentage of Navy flyers who come out of emergency landings with only bruises strengthens confidence in flying over water.

In the early stages of an operation the Navy flyer's duties are more or less routine and normally not heavy. He will do his squadron jobs, listen to lectures on the coming operation, engage in gunnery or other practice, and take his turn at flying combat air patrol or anti-submarine patrol. These turns may come frequently on one of the smaller combat carriers, less frequently on the large ones.

But the picture can change quickly. If enemy planes threaten the task force, the airman must spend long hours in the ready room in flight gear, and perhaps long hours in the air. He must be ready to fly and fight at any time of the day or night, knowing that his own safety and even his own life are minor considerations compared with the safety of his ship. If the weather turns bad it may constitute a far greater hazard than the enemy, and the nervous strain of waiting for a decision on whether to fly is sometimes as great as that of the flight itself.

While the airman's actual time in combat or on a strike against enemy objectives is small compared with his total time at sea, the nervous strain of operations in the combat area tends to be cumulative. The long days of routine in the combat zone are not days of relaxation, no matter how quiet they may prove to be. The knowledge that a submarine attack or surprise enemy air attack is always possible, that there are days of fighting to come, that there will be inevitable losses—these mental hazards build up their effect as time in the combat zone increases. That is why the pilot's time there is limited—in the interest of his future use to the Navy.

Before the "K day" of a big strike, the atmosphere aboard the carrier changes almost imperceptibly but definitely. There is general quarters to be stood by all hands an hour before sunrise and an hour before sunset and at any time an enemy or unidentified plane approaches. Good weather, particularly on moonlit nights, may bring torpedo attacks for two or three nights before the day of the raid, so all hands may often be kept awake at night, sapping badly needed energy.

"K day" may thus come as a relief. The airman may seem to take it casually, joking with each other about the going being too tough for whatever squadron is not their own. And some of the jokes are a little grim—such as offers to "take care of your effects and your girl"—but everyone knows they are merely efforts to relieve the tension.

While a strike is in progress, miracles of operational efficiency are frequently performed. Under the knowledge that "this is it," a veteran air group will steady down and take off and land safely with phenomenally short intervals between planes. Accidents are likely to begin piling up toward the last of a prolonged operation, perhaps on the third day of a strike when fatigue is beginning to show and the time for going aboard and starting back to base is near. Then the landings begin to get ragged and the momentary slips which bring crashes may occur. If planes are late in returning the squadron mates of the men still out on combat strikes are likely to sweat it out in the gallery walkways.

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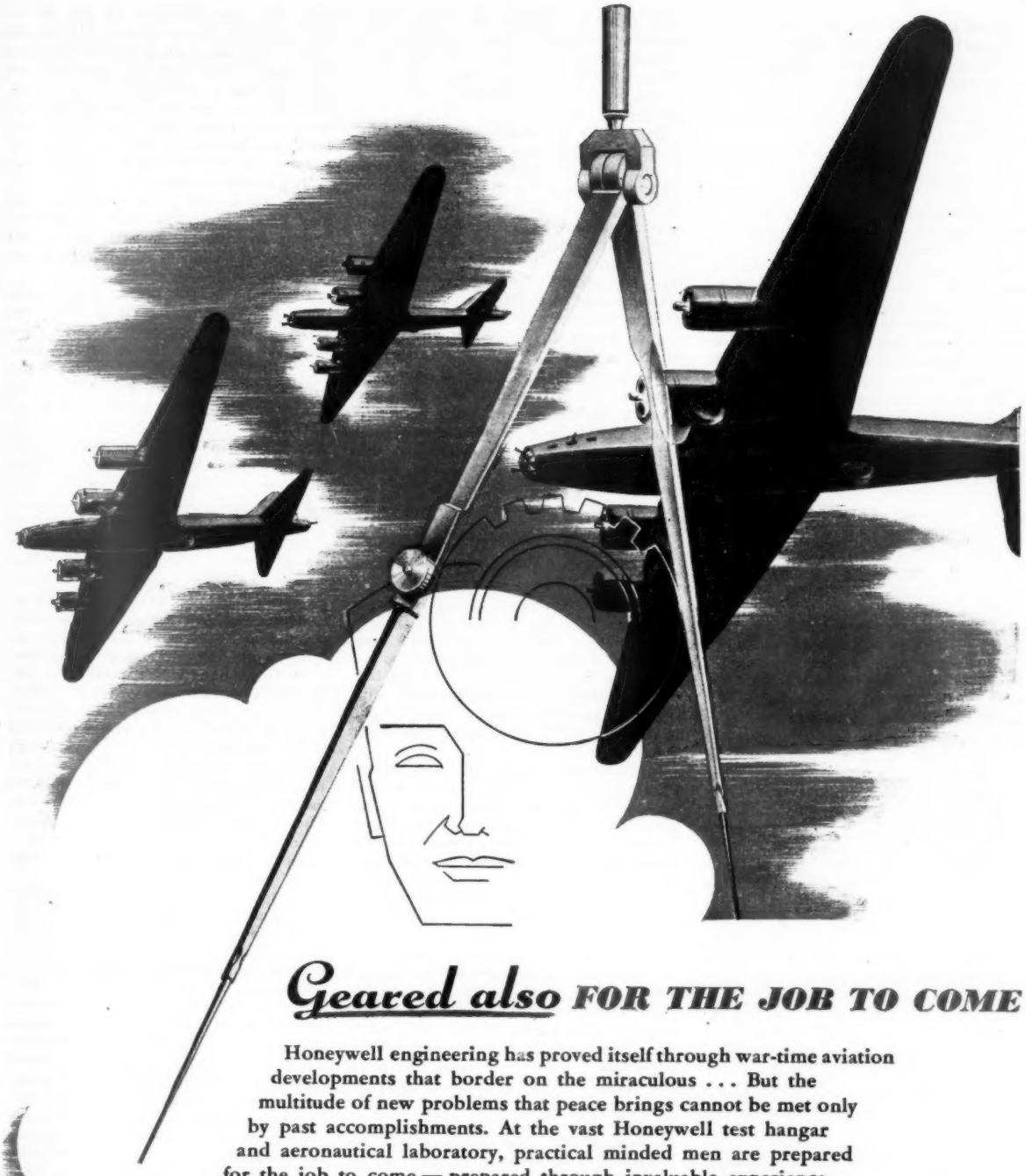

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operation are such that the chances of a man who hits the sea are extremely good. The fine work of float planes, flying boats, surface vessels and submarines in rescue operations is a great morale factor in Naval Aviation. It has saved hundreds of our best-trained flyers.

"It's a mighty good feeling to know that even if you were shot down in Tokyo harbor the Navy would be in to get you," was the comment of one carrier pilot. It reflects the way all of them feel about the rescue services provided.

Once a strike is over and Air Intelligence has the results, the flyers gather to discuss the events of the day. Your Navy flyer is modest about his accomplishments; in most cases he will err on the side of underestimating rather than overestimating. He is eager to call attention to the accomplishments of others and generous in his praise. But quite naturally he also likes to talk about his own combat experiences—and the others give him a chance to "sound off." In those post-combat sessions, hands and arms swing to simulate the dives, turns, pull-ups, rolls and other maneuvers of combat. Laughing comes easily, tension is off, and the stock saying "Why hell, man, it was just like the movies," pops into every man's story.

The Naval or Marine aviator is the world's most versatile flyer. He has had a longer, stiffer training period than any other airman in the world. He learned to fly in land-type planes and then he mastered the technique of carrier take-off and landing—a technique once considered so specialized that early airmen formed a "Langley Pilot's Association" of the select few who had qualified for carrier duty. That technique, amazingly enough, is now routine for all the thousands who fly for the Navy.

Because most of his flying is done over water, where there are no landmarks, the Navy or Marine flyer must be a fine navigator. Ordinarily he is obliged to depend entirely on his own knowledge of this important subject to get himself home. Aside from his role as flyer, he is much like any other member of the armed forces of the United States. He is not likely to be long out of college but if he has been in the Navy for some time he probably has a wife and baby at home. He will show you their pictures at a moment's notice—and then ask to see *your* family pictures. He would like very much to have the war over so he can get back to his normal routine of living but he knows that the job of defeating the enemy may take a long time. He is perfectly willing to take his turn in the combat zone and his chances in a hazardous assignment *along with others.*

To paraphrase the words of a torpedo plane pilot, writing about his own specialty: "How does such a pilot differ from any other boy now in military service? That is an open secret. He is just like anyone else. He comes from the United States, he is in his 20's, and he has a reasonably specialized technique designed to contribute to the defeat of the enemy. That's what he is, and, until the war is over, all he wants to be." END

Photography

(*Continued from page* 162)

existing aboard a carrier may not be possible. During the early Solomons campaign Army pilots flying reconnaissance missions were not schooled in recognition knowledge of surface shipping. To overcome this deficiency Navy photographers had to be assigned to Army reconnaissance flights in order to provide this expert knowledge. The first operational reconnaisance flights in the South Pacific were made in mid-July, 1942, from New Caledonia. The personnel consisted of Army crews and Marine Corps photographers, under direction of a Navy photographer.

Unlike those flown from carriers, land-based photographic missions use multi-engined airplanes — *Flying Fortresses, Liberators, Venturas, and Lightnings.* This type of reconnaissance is conducted at high altitude. Long distance reconnaissance at Bougainville and Rabaul was usually conducted at 30,000 feet; nearly always the altitude will be 20,000 feet or above. The *Lightning,* a remarkably long-range two-engine fighter-pursuit, has become the Army's primary photographic reconnaissance plane. With all guns and firing mechanism removed, it can operate up to 36,000 feet over the target area with standard photographic equipment. Its speed also makes it useful for low-altitude missions. Navy and Marine crews prefer the *Liberator* to the *Lightning,* since the *Liberator* can go farther over water and carry a crew of 11 to man the guns if needed. The big bombers go on these flights loaded for bear. One *Flying Fortress* on a photographic mission was hopped by as many as 20 Zeros and came back with pictures. *Lightning* losses have been small.

Problems in the South Pacific, besides the great distances which had to be flown, included an almost total lack of information on the weather and on the enemy opposition over the target area. Another was the problem of water temperatures. To process film, water temperatures must be controlled. The average temperature of fresh water in the South Pacific was between 80 and 85 degrees, which is too warm for laboratory uses. To meet this problem, ordinary refrigerator units with several ingenious, makeshift attachments to regulate the water temperatures were installed.

In November, 1942, the first Marine Photographic Squadron arrived. It was followed in February, 1943, by an Army squadron and soon afterward a processing laboratory was constructed. An additional Navy squadron turned up a little later and the Army, Navy, and Marine squadrons, together with the Navy Photographic Interpretation Squadron, were organized into a Wing.

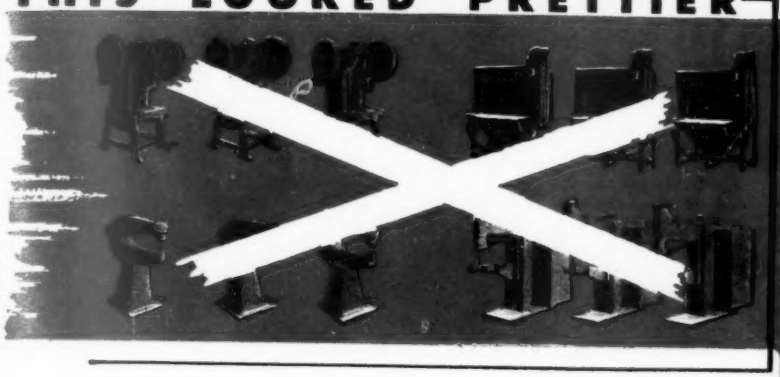
Because of green flight crews, Navy photographers were carried on as many strike missions as possible to provide photographic reconnaissance. "The results in some cases were excellent but we had the problem of lack of appreciation of what was required to procure suitable photographs," said Comdr. R. S. Quackenbush, Jr., Director of the Photographic Division, Bureau of Aeronautics.

"This difficulty," he added, "was largely remedied by demonstrating to the pilots what actually had been accomplished with photographs. Another aid was to provide a series of photographs taken under various conditions. For instance, photographs were shown that were taken from the same position but with various focal length cameras. And there were others taken at various altitudes and distances, and when shooting through clouds, and so on. These displays were placed in each operational unit, and after discussing them thoroughly with the pilots, the quality of the photographers' work was greatly improved."

A handicap to thorough photographic reconnaissance in the South Pacific was a lack of training of photographic personnel and of pilots of multi-engined aircraft. As a case at point, one officer pointed out that if sufficient airplanes and trained photographic crews had been available when Guadalcanal was first seized, it would have been possible to photograph practically all the Solomons group at low altitudes with the equipment then available—and with practically no enemy opposition. As it turned out, the planes were not available until the enemy had built up airfields in the area. Photographic flights were then subject to attack—and it was necessary to fly at higher altitudes and use cameras of longer focal lengths.

In spite of these and similar obstacles the photo wing in the South Pacific managed to do a remarkably fine job. It kept 70 men busy in the laboratory supplying correct photographs to Pacific commands. Production for one week ran to 16,700 aerial prints, of 10x20-inch size. More than 31,000 square feet of film was exposed during that one week, and to obtain those pictures two planes used 18,000 gallons of gas. The services rendered were numerous and highly essential. There had to be previews before a strike to determine objectives, and it was important to know about damage assessment after the bombing. Shipping in Pacific waters desperately needed new maps more accurate than the out-of-date charts they were supplied with. To produce a scientifically perfect chart, the hydrographic office often needs several months. Yet those hazardous atolls, not yet above the surface of the sea but visible from the air, had to be disclosed. So the airplanes worked out navigational charts, using color photography to show soundings—comparing the colors with those of known depths—and had them ready for delivery in 10 days' time. They weren't perfect charts, but they were adequate for all military purposes. Captured islands had to be mapped and the airplane did the job.

THIS LOOKED PRETTIER



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Day after day we photographed our own airfields to determine needs of repairs. The camera likewise helped the doctors with malaria control, discovering ponds and streams that needed to be sprayed. One of the most interesting and important jobs is the photographic military "grid," or photo map. If a surface ship wants to plaster an enemy island the gunners are provided with one of these grids by the photographic unit. It shows exactly where the bridge or warehouse or gun emplacement is situated. For an invasion, the photographers also supply the raiders with maps. Every supporting gun crew on the vessels offshore knows what its particular target may be and the men going ashore know their objectives, too. Before the Green Island invasion, thanks to photographic maps, each separate invader knew the particular tree he was to head for when he ran across the strip of beach!

There is no universal all-purpose camera as yet. Generally, there are certain basic requirements in aerial reconnaissance and the equipment best satisfying them on any particular mission is the equipment used. Pictures should be taken on the largest possible scale—the bigger the scale, naturally, the more it shows. But there are variable factors controlling the scale—things like clouds and anti-aircraft fire, which may force the photographic plane to the limit of its altitude. Vertical photographs are considered best for general reconnaissance purposes, though the type of mission, the enemy, or the target may require low obliques. On the whole, equipment is relatively standardized. The F56 Fairchild aerial camera with 20-inch lens is a favorite of aerial photographers for registering action, bomb hits, damage, and general information. Then there are other standard cameras like the K17 12", the K18 24", the K25, the K24, and the K20. When properly installed all this equipment may be controlled remotely by the pilot, eliminating the necessity of carrying a photographer along.

More recent advances in military photography include color film, the trimetrogon wide angle camera, and the continuous strip camera. The last is just what its name implies—a camera taking a continuous photograph as the plane flies over the target area at low altitude. As a medium for photo interpretation the color film is unexcelled, adding the shadings of color to the linear outlines of the black and white photograph. The tri-metrogon installation consists of three standard K17 cameras with wide-angle lenses, each set for different surface views—one vertical, one oblique to starboard, one to port. With simultaneous exposure, the three cameras provide a pictorial view from horizon to horizon along the plane's course. It is installed principally in fighters for purposes of mapping.

Exact origin of photographic reconnaissance is vague. There were, it is known, "military photographers" in the Crimean War. And the Army Balloon Corps tinkered with photography in the Civil War. There was a stronger attempt at military photography in 1914, and excellent photographs were made but equipment was not comparable to that used today. The first American aerial film camera, the Eastman K-1, did not come into use at the front until 1918.

Great emphasis is placed by aerial photography on the art of photo interpretation. The shallow, single-line defenses of the first World War did not put the strain on photographic interpretation as does a modern war of fluid movement. Wide experience in camouflage was obtained in the closing phases of the last war. Army "photo readers," as they were known, became so well acquainted with their assigned reconnaissance areas that they finally became able to spot almost any change through pictures.

Pioneers in naval aviation photography in this war include Comdr. Robert S. Quackenbush; Maj. G. L. McCormick, Director of Intelligence, Marine Division; and Lieut. Col. Charles H. Cox, USMCR, of the Photo Command, South Pacific. These officers went to England in the late summer of 1941 and got all available information on photography from our Allies. Among other innovations that they noted was the fact that the old form of visual reconnaissance from the air is no longer possible because of fighter planes and antiaircraft fire which force reconnaissance planes up to 40,000 feet.

Photo interpretation corollary to taking military pictures, requires a knowledge of tactics, ready recognition of shipping and material and an understanding of the psychology of the enemy. A photo interpreter not only must know what to look for but he must have a pretty good idea of what to expect. Navy photographic interpreters have uncovered a number of tricks pulled by the Japs. A case in point occurred during the Jap occupation of Kiska. For some time a bombed enemy transport lay off Trout lagoon in Kiska Harbor, apparently dead in the water. During a night of heavy fog, the dead transport was towed to a different spot and a loaded troop transport anchored in its place. When our bombers went over they naturally spotted the new shipping position and proceeded to bomb the already dead ship while the Japs completed unloading of the troop transport. The photo interpreter noted this maneuver and we stopped it effectively.

On Munda another trick was exposed. There had been no suspicion of enemy activity on Munda Point, which was heavily grown with coconut palms, until a Navy interpreter spotted something. At first he was unable to say exactly what was amiss but he ordered continued reconnaissance and eventually it all came to light. The enemy had a new airfield under way, but was building it under cover of the dense palm foliage. The trees apparently were to have been cut down when construction was virtually completed. But American planes cut down the trees prematurely and the airfield with them. END

Ghost Patrol

(*Continued on page 157*)

Continuing his patrol, Lieutenant Gentilini decided that it was resolving itself into a "water haul." There is a lot of ocean included in a *Liberator's* sweep and it looks a good deal alike.

"Something off the starboard bow," yelled Lieut. (jg) G. S. Brown, Jr., the co-pilot. Gentilini nosed the big *Liberator* over and had his radio man tune the advanced base frequency. "Suspicious merchant vessel sighted," he reported. "Flying Union Jack. RAF circles painted on deck. Headed true north, estimated speed, 14 knots." He then gave the exact position of the ship.

"Looks like a phony," radioed back Lieut. J. C. Brennan from the base.

"If I had a bombsight and some bombs instead of these cans," said Gentilini, "I'd cut that baby half in two. I'd like to try it, anyway."

"Let him go," said Brennan. "Somebody else will get him."

Lieutenant Gentilini had kept the record clear. Nothing had yet slipped through that area without being sighted. And 10 days later the little merchantman flying the British flag and bearing the RAF insignia on her topsides steamed into the Bay of Biscay. It was, of course, the *Alsterufer* in disguise. The British not only blasted her out of the water but they sank three German destroyers that were sent to convoy her in.

The routine sweeps continued. A few days after the *Alsterufer* was sunk, a submarine showed up in the area. There were distant sightings, but the bombers could never get in quickly enough for an attack. The sub did not seem to be going anywhere in particular nor did it seem in any great hurry to get there. But always, before a *Liberator* could get within range, it would be submerged and safe from attack. It loitered around for three days.

The sweeps continued. On January 1, 1944, when less busy people were celebrating the New Year, Lieut. Mearl Taylor of the same squadron was out with his crew over the Atlantic. It was late in the evening. The sweep was on its southermost leg and was about complete. Taylor had nearly reached his prudent limit of expectancy and in a few more minutes would be heading back.

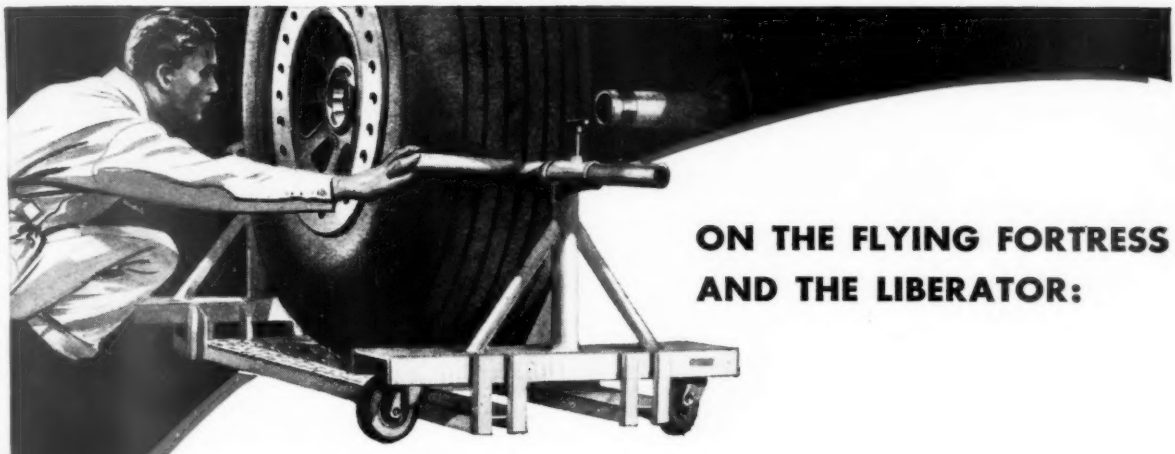
"Something away off to the south," the tail gunner called over the inter-phone. "Can't tell what it is from here."

Taylor promptly headed in the direction of the "something," which was soon identified as a merchant vessel flying the British flag and with the concentric circles of the RAF on the topsides.

Taylor sent a challenge and the ship hoisted identification pennants. But strangely enough, the pennants were fouled in the halyard.

The ship was ordered to heave to but she kept plugging away on her northward course.

Then Taylor glided across her bow with

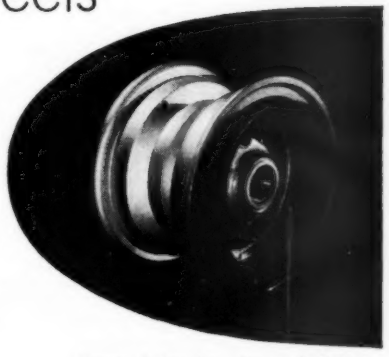


ON THE FLYING FORTRESS AND THE LIBERATOR:

Weight-saving magnesium landing wheels

The landing wheels of a four-engine bomber are actually in use only a small percentage of the aircraft's total flying hours. But during those few crucial seconds when tons of speeding weight first touch the runway, those wheels go to work, and they must do their work dependably and well. In the air, when the same wheels become mere lazy weight, extreme lightness is a matter of critical importance.

Because magnesium is the lightest of all structural metals and because it is strong and durable, the main landing wheels of the Boeing B-17 Flying Fortress and the Consolidated B-24 Liberator logically are constructed of Dowmetal Magnesium Alloy. So are many other parts of these highly efficient aircraft.



Hayes Industries, Inc., of Jackson, Michigan, one of the country's largest manufacturers of aircraft wheels, uses Dowmetal in this sand-cast 56-inch landing wheel for heavy bombers.

Magnesium merits consideration in any industrial project where metal is put in motion—in rail and highway transportation as well as in the air—in the moving parts of machinery—in portable, hand- and power-operated tools and equipment. As America's pioneer in the development of magnesium, and as its major producer, Dow also maintains research and production facilities for converting this key metal into permanent mold, sand, and die castings; extrusions; forgings; sheet, plate and strip; and fabricated assemblies. Inquiries will receive prompt attention.

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his navigator shooting .50-caliber slugs at the deck as they passed.

The merchantman opened up on Taylor's plane with 20-mm. antiaircraft fire. One shot knocked out the No. 3 engine. Another tore into the wing, exploded, and wounded Robert Ellsworth MacGregor AOM2c.

"I had the base on my radio," said Taylor later. "I had a man hit, had lost an engine, and was right up on my PLE. I had the navigator take a fix and then got the hell on back to the base."

The information, including the location of the enemy ship, its identifying characteristics and its speed and course, were radioed to Admiral Ingram's headquarters in Brazil. Two destroyers and a cruiser were ordered to the scene.

But distances spread out in the South Atlantic, and even a fast cruiser like the *Omaha*, and fast destroyers like the *Jouett* and *Somers* which were in the area, can eat up only a small portion of those distances in a day.

A short time after Taylor quit the scene for base his squadron mate, Lieut. William R. Ford, arrived at the expected position, allowing for a 14-knot northward course of the merchantman during the delay. The merchantman, however, was not there.

Ford made a pattern search and about midnight picked up a ship. But this ship was far to the south and steaming southward at about 18 knots!

He stuck with this 18-knot southbound ship until he was hundreds of miles from base and had reached his prudent length of endurance. It was necessary for him to be relieved by Lieut. (jg) W. N. Walker, who continued to keep contact with the ship until almost daylight, when he, too, was forced to return to base.

And now complications set in. On the morning of January 2, 14 hours after the ship was originally sighted by Lieutenant Taylor headed north and doing 14 knots, the squadron had a southbound ship doing 18 knots in its sights. The question came up as to whether this southbound ship was the one that had fired at Taylor or a friendly ship that had wandered off course.

The first plane to take off from the base was that of Lieut. Robert T. Johnson, USNR. The entire crew of his plane may appropriately be named here, since their names will be permanently listed in Naval aviation's roster of heroes:

Lieut. Robert T. Johnson, USNR, of Fredericktown, O., pilot; Ens. James Harvey Wells, USNR, of Batavia, N. Y., second pilot; Ens. John D. Cowan, USNR, of Mineola, Tex., third pilot; Ens. Eugene Bowers, USNR, of Chehalis, Wash., navigator; Donald Wilber Carpenter, AMM2c, of Grand Rapids, Mich.; William Edward Winter, ARM2c, of Ypsilanti, Mich.; Joslyn Simpson, ARM3c, of Athol, Mass.; Edward James Fisher, AOM3c, of Buffalo, N. Y.; George Edward Roper, S2c, of Social Circle, Ga.; and Russell Hamilton, AMM2c, of Whittier, N. C. Their plane and the entire crew were to be lost on this patrol mission after tangling with the guns of one of the German blockade runners.

Lieutenant Johnson, Lieut. W. E. Hill, and Lieut. John T. Burton laid out their patrols in relays that were calculated to cover a maximum distance and keep them from running out of gas. At four p.m. Johnson's lookouts sighted a ship. It was headed south and doing an estimated 18 knots but it certainly did not look like the ship seen 24 hours earlier by Lieutenant Taylor. It had an extra smokestack, was painted a different color, and the position of the kingposts in relation to the masts was not the same. However, it was flying the Union Jack and the RAF concentric circles were visible on the deck of the ship.

Johnson swept in and challenged the ship for her identification. The challenge was answered with a burst from a 20-mm. antiaircraft cannon. A desperate crew can build a smokestack and shift kingposts overnight.

Before Johnson could pull his big bomber out of range, one engine was shot out, a gas line was severed and a wing was damaged. He had almost reached his PLE, and was hundreds of miles from base. So he contacted Lieutenant Hill, who had left the base four hours after he had and was 400 miles away.

"Home on me," instructed Johnson. "This baby has got to be kept in our sights."

It must be remembered that the destroyers in the area were steaming toward the expected positions of the blockade runner. About the time Hill started toward Lieutenant Johnson's position he sighted a merchantman of his own. It was flying the British merchant flag and was headed south! Hill challenged and immediately received the proper code identification signal. But according to the best information there was no British ship due to be in that area at that time. So Hill radioed the destroyer *Somers*, which was steaming into that area, and asked it to verify the identification. Then he flew to Johnson's position. The *Somers* notified the Britisher that she was sending out a boarding party for further verification of her identity, and just as the boarding party reached the British boat, Hill, now with Johnson, radioed his base that Johnson's plane had been badly shot up.

The *Somers* radio man caught only part of this message, and mistakenly got the idea that the destroyer's boarding party was being fired upon. The *Somers* immediately squared off and laid her guns and torpedo tubes on the merchantman, ready to blast her. A second later, however, the boarding party reported that the vessel, was, in fact, a British merchantman and 100 or so miles off course.

The Britisher went her way, and the *Somers* once more began chewing up the miles toward the original quarry, which was still being stalked by Hill.

In the meantime, Lieutenant Johnson, with one engine gone, and his plane otherwise damaged, had started for home with just about enough fuel for the flight. It was late afternoon when he started. All along, he kept in touch with his base by radio. As the hours dragged by, and the tropical night drew on, the desperation of his plight became more and more apparent. To make matters worse, 200 miles from base a second engine quit. He reported his position and added that he thought he could make it. An hour later his report was still hopeful. All the squadron members at base stood by, ready for an emergency take-off. When the plane was within 90 miles of the base, the final message came in, weakly. "Another engine is dead," he said. "I've got practically no gas left, only one engine and just 600 feet of altitude." That was all they ever heard of Lieutenant Johnson and his courageous crew.

The squadron searched for 15 days without a let-up but never ran across any sign of the plane or its occupants.

During Johnson's heart-breaking attempt to get home, Lieutenant Hill kept riding herd on the southbound enemy ship, getting farther and farther away from his base and approaching nearer and nearer his gas limit. The *Somers*, one of the newest and fastest surface vessels afloat, kept sawing off the distance, homing on Lieutenant Hill's radio. Hill became impatient with the snail-like progress of the little destroyer. He radioed: "What's the matter, *Somers*? Have you broken down?"

The *Somers* had not broken down. It was in there pitching for all it was worth. A little later—the hour was 10:15 p.m.—the *Somers* radioed that she had sighted the enemy and that Hill could consider himself relieved of the watch.

"Want me to look out for your ranging shots?" Hill asked.

"Go home," said the *Somers*. "We'll take him."

Hill turned homeward. The *Somers* closed in and opened fire. The enemy turned out to be the 7,000-ton *Weserland*, one of the ill-fated German merchantmen. When she blew up, she spouted bale after bale of crude rubber all of which were picked up from the ocean and salvaged the next day.

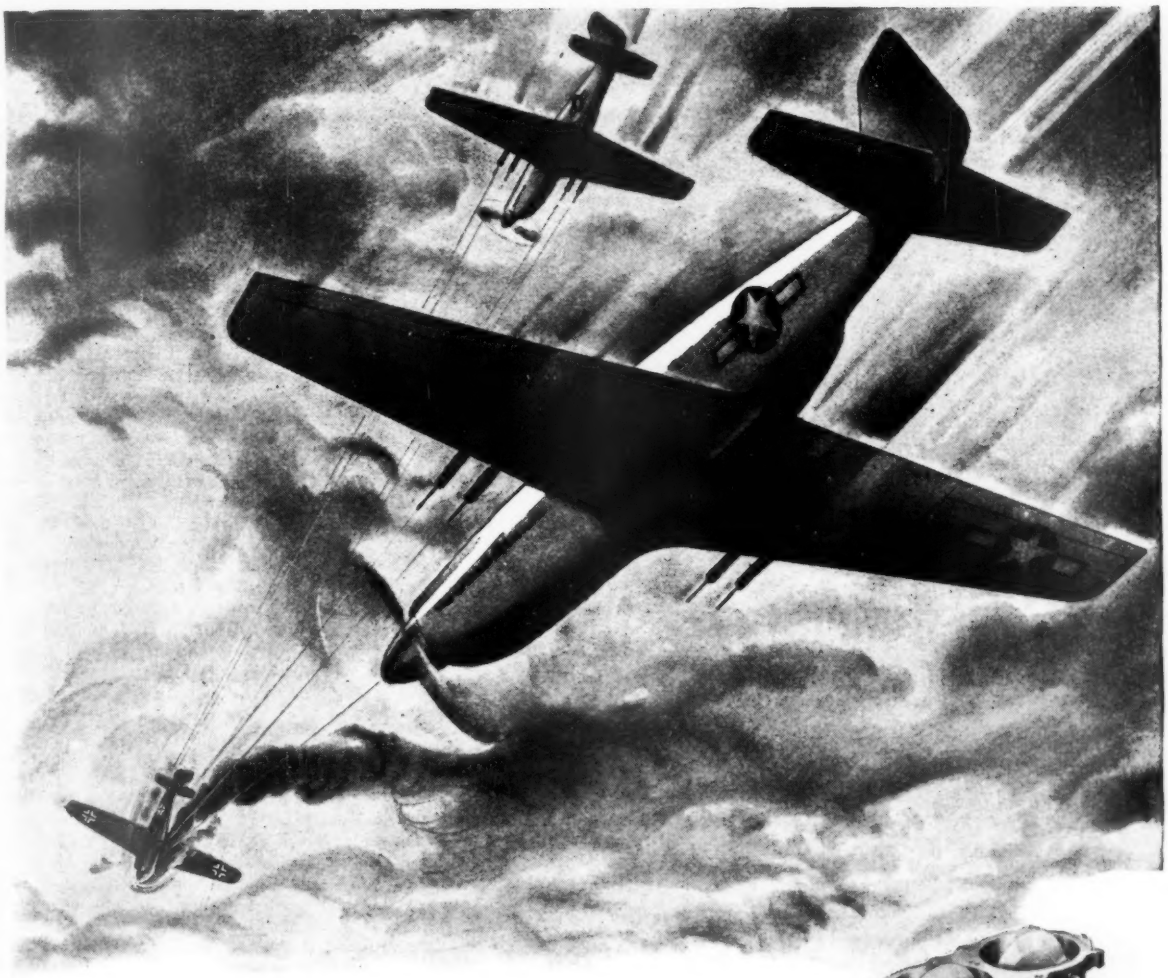
The rest of the story is short. The *Omaha*, flanked by the two destroyers, headed south in search of the remaining ships. One of the cruiser-based scout-observation planes shortly sighted the Nazi ship, *Burgenland*, but as the *Omaha* steamed within range, the *Burgenland* began to settle—scuttled by her crew. This action was repeated the following day, when the scout plane sighted the *Rio Grande*.

Five of Hitler's merchantmen had kept their rendezvous and tried to run the blockade with their precious cargos, and they had failed.

In destroying these ships, Naval aviation contributed: More than 200 hours of tough flying by a hard-flying squadron at extreme cruising range; a bomber with four officers and six highly specialized and thoroughly trained crewmen lost; a highly trained crewman wounded; and one expensive airplane badly damaged from gunfire of the enemy blockade runners.

In addition, of course, was the work of the observation-scouts from the *Omaha*.

The part played by Naval aviation in that extended battle is worth a sentence in any magazine's account of it: *Ghosting over the South Atlantic, patrol planes sighted a strange merchant vessel.* Yes indeed. END



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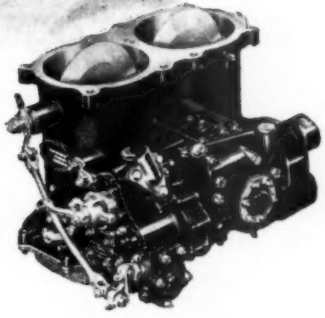

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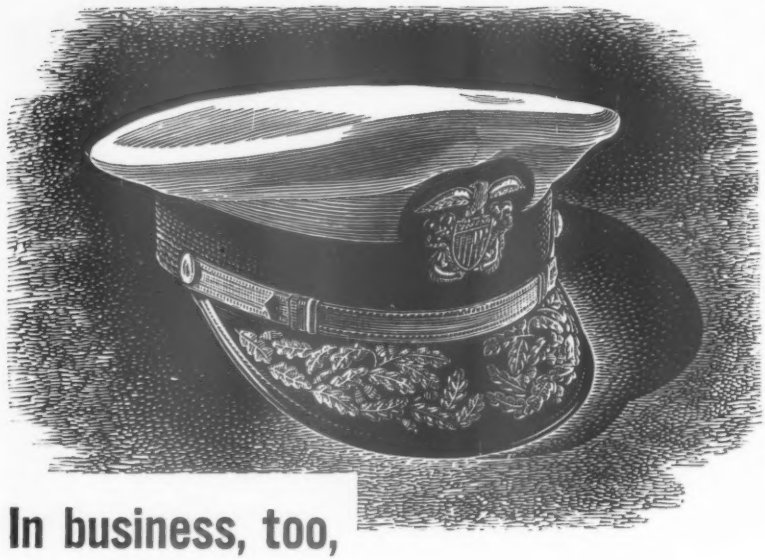

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One Ally

(*Continued from page* 109)

well as our own pilots had. Our excellent system of fighter cover for bombing strikes was only then being organized. Today it is one of the great tactical triumphs of Allied aviation teamwork.

In the South Pacific, Navy, Marine, Army, and the New Zealand pilots work in harmonious and effective co-operation. On any given bombing mission the fighter cover will be stacked up in four layers and include pilots of all four services. Ordinarily, for "high cover," Army men in *Lightnings* are used in order to take advantage of their plane's wonderful performance at great altitudes. Occasionally, too, Navy or Marine squadrons flying either *Corsairs* or *Hellcats,* will aid in high cover. Stacked down a layer there will be squadrons of *Corsairs* and *Hellcats* as "medium cover" and, down a few thousand feet more, squadrons of these same planes, flown by both Marine and Navy pilots, as "low cover."

At the bottom of the plane formation are the most rough-and-tumble cluster of all—the protective layer of planes known as "close cover" which discourages enemy fighters from making low passes at the bomb carriers.

The New Zealanders did all the close cover work for many months. They were assigned it for two reasons: (1) their *Warhawks* perform better at low altitudes and (2) the New Zealand pilots are happy only when they are doing the roughest job available.

At Munda, the New Zealanders operated as the sole fighter cover on many early missions and then, as our strike system developed, they settled into the close cover assignment. In countless raids against places like Kahili and Torokina (before we had moved into Bougainville) the New Zealanders flew close cover and enhanced their notoriety among the Japanese. In addition, they carried out numerous other sorts of missions. Perhaps the favorite, then and now, is the fighter sweep, on which a formation of fighters lashes into an enemy base with the idea of beating up all available installations and knocking out as many planes on the ground and in the air as possible. An operation of this kind is regarded as a picnic by all fighter pilots, but the New Zealanders seem to take especial nourishment from it. Merrily buzzing and strafing everything in sight, they always return home reluctantly and then only if the target area generally resembles an ancient and somewhat blackened cheese.

Among the few criticisms of New Zealand flyers, in fact, has been their overenthusiasm. Single planes have gleefully lit out after several Zeros with the apparent intention of chasing them clear back to Tokyo.

The New Zealanders expressed delight over the start of our air war with Rabaul, by far the most formidable Jap base in the South Pacific. Rabaul appealed to their competitive instincts; it was a base worth jumping on. During a big raid,

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Grand Central Air Terminal, Glendale, California. CAA Approved Repair Station No. 221.	30 veterans seasoned in aircraft overhaul and repair.	Civilian aircraft repair and maintenance.
1942		
The same	100 people. A few women, mostly in fabric work.	Immediate conversion to war activity AAF contracts, specializing in salvaging the unsalvagable. Manufacture of motor mounts and parts.
1943		
Metropolitan Airport, Van Nuys, California. Purchased property and buildings. New construction, renovation enlarging, modernization.	200 men and women, wonderful people; some with sons and grandsons in the service. All eager to do their bit, and turning out work of exceptional quality.	Exclusive Army and Navy work. Added activity necessitated this move to Metropolitan Airport where sandblast, heat-treat, magnetic inspection were added to sheet metal, woodwork, fabric, machine shop and welding.
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one of their number, a rather retiring flight lieutenant named Vanderpump, became separated from his fellows, he explained later, to protect a parachuting Navy dive bomber pilot. He "found himself," as he put it in his report, over Lakunai airfield, which was bristling with antiaircraft guns. He picked up some useful information for the intelligence officers. On the way down approximately 30 Zeros jumped him from above. He shot up "a number of them," observers reported, and the rest departed. Then Vanderpump elected to have a look at Rabaul township itself, which might accurately have been described as one large carpet of antiaircraft. "I flew over Rabaul," he wrote in his report, "at zero feet, strafing the roof-tops." According to a Navy pilot who saw him, he had a thoroughly good time, chasing the residents into their cellars and pretty well closing up business for the day. Vanderpump wound up his report, which was couched throughout in stately and restrained language, with the following observation: "My aircraft received only three 7.7 hits, two in the starboard wing and one through the propeller."

The New Zealanders' basic training takes place in their own country, with planes we have loaned them, and lasts about a year, which includes their first stretch in the *Warhawks* or whatever operational type they have chosen. From New Zealand they come up to Espiritu Santo, one of our biggest advance bases, and receive instruction from U.S. Navy pilots. They also are learning to operate dive and torpedo bombers and search and patrol planes as well as fighters. Besides the spectacular work of the fighters, New Zealanders have already flown some on combat missions in other plane types.

Some months ago, a New Zealander in an old slow Grumman *Duck* was flying a search "up The Slot"—that is, up north in the Solomons. En route he spied a formation of six Jap Zeros. The normal reaction of anybody in a *Duck* would be to scuttle for home or fly into the nearest cloud and pray. However, the New Zealand search pilot promptly abandoned the search and dived into the middle of the Zeros. In some manner never quite explained, he knocked down one Jap and frightened the rest into an immediate departure.

By and large, New Zealand pilots are smaller than the average American pilot. Tough, knotty, good-natured, they seem to make a fetish of taking on impossible jobs with cheery unconcern. All through the Solomons they are favorites with Navy, Marine and Army pilots and are popular figures in the mess halls and officers' clubs. Their presence with the Navy in the South Pacific is as welcome as that of the Australian pilots who have been flying with the Army on New Guinea. An outstanding characteristic is their extreme modesty. In the face of compliments, the average New Zealand flyer will turn red, hem, haw, sputter and gurgle, and then desperately attempt to steer the conversation into more agreeable channels.

The New Zealanders use a number of enlisted pilots and also a few Maoris—the Polynesian natives of that country. The enlisted mechanics and other ground crewmen are among the foremost reasons for the New Zealand air successes. At Bougainville, for example, where two squadrons of fighters have been operating daily for a long time, the mechs have an especially disheartening job. Keeping two squadrons of ailing *Warhawks* in the air is widely regarded as almost superhuman. Working without any great backlog of materials, the New Zealand crewmen comb the area like hungry scavengers and then come back to their field to patch, improvise and repair. Any stray metal on Bougainville magically disappears overnight, and turns up the next day some place on a P-40. Whenever one of the planes crashes within a reasonable distance, the mechs lug it back, no matter how bad its condition. Watching a group of these gay little men emerge from the bush dragging pieces of unidentifiable wreckage no longer causes amazement in the Solomons; everybody knows that the original airplane will somehow rise like a Phoenix from the ashes.

The enlisted ratings are: aircraftman, second class; aircraftman, first class; leading aircraftman; corporal: sergeant; flight sergeant; and warrant officer. The aviation ranks are: pilot officer (corresponding to ensign in the Navy), flying officer, flight lieutenant, squadron leader, wing commander, group captain, air commodore, air vice-marshal, air marshal, air chief marshal, and marshal of the Royal New Zealand Air Force.

S/L J. A. Gibson is one of the most popular New Zealand pilots. He has been flying and fighting in the war since 1939 —first in France, when that country was still holding out against Germany, then through the Battle of Britain, and since June, 1942, in the Solomons. Twenty-eight years old, Gibson was born in Auckland, where he went to school and college and was apprenticed to a chemist when the war broke out. He is married to Ethel Formby, sister of the famous English comedian George Formby. Having 13½ Germans and one Jap to his credit thus far, and having been shot down five times, Gibson must be regarded as an authority on the merits of our air opponents.

He feels that the Jap pilot is not as aggressive as the German and doesn't press his attacks home as doggedly. He thinks the Jap aircraft are quite good; in fact, he thinks the Japs should be doing much better with them. Surprisingly enough, Gibson believes that, individually, the French were perhaps the best pilots he has seen thus far in the war. In his opinion, however, their skill was rendered ineffective because they had little of the Americans' wonderful feeling for teamwork. Squadron Leader Gibson has some unusual memories of France. On one occasion when he was shot down, his plane sailed through a French farmhouse and literally came to rest in the kitchen, where the peasant family was having supper. Since nobody was hurt, they laid another plate for him.

One of the most revered New Zealand pilots was Flight Lieut. J. O. ("Spanky") MacFarlane, who was recently lost over Rabaul. He was the last of four MacFarlane sons killed in this war. Three of them were pilots and one was in the infantry. Flight Lieutenant MacFarlane was in the first sweep over Rabaul, on which his squadron got six Japs.

By now the Japanese pilots have learned to recognize all our plane types. They have a hearty respect for the Navy and Marine *Corsairs* and *Hellcats* and the Army's *Lightnings* and *Airacobras*. But they seem to have a singular aversion to remaining in the same area with *Warhawks*. Some months ago Flight Lieutenant Balfour, an especially modest New Zealander, was flying over Torokina from Ondonga and found himself separated from his unit. He continued to putter along at an altitude, surprisingly enough, of 24,000 feet. Suddenly he saw "30 or 40 Zeros" about 2,000 feet below him. Naturally he attacked without delay, diving into the midst of the group. He shot at one which exploded, and he was hot on the tail of another when, as he wrote in his report, "I was simultaneously attacked from all points by several groups." He batted down another Zero and then started spraying lead around more or less promiscuously. In the face of this unexpected conduct, the Japs discreetly withdrew. One Jap later taken out of the water was asked what hit him; he kept waving his arms wildly and crying, "P-40, P-40!" Just after the skirmish, the New Zealand flight control, worried, finally got through to the lost lieutenant. "Did you make contact?" asked the flight control. "Yes," said Balfour simply. His answer is still considered a classic around Bougainville.

New Zealand flight lieutenant and two pilot officers on a U. S. Navy vessel in the Pacific.

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The Seabees

(*Continued from page* 121)

occasion in the Treasury Islands a landing force was in a tight spot. The Japs were solidly entrenched in pillboxes and were raking the boats with murderous machine gun and mortar fire. Feeling that it was suicidal to wade to the beach in the face of this, the defending troops were almost on the point of temporary withdrawal. But at that very moment the Seabees came leaping to the rescue. They piled into several bulldozers, lowered the ramps, and went helling up on the beach. In a little less than 15 minutes they had cleared paths for several new roads, leaving numerous pillboxes in the gutters.

Trained for combat, Seabee battalions are given a generous allowance of armament like Browning automatic rifles, submachine guns and 20-mm. antiaircraft guns which they have used effectively in many places. Seabee casualties have frequently been high; hard luck seems to dog them now and then. Once at Munda a Jap bomb lit squarely on a Seabee mess line, and at other times snipers seem to have concentrated on Seabees rather than troops. Both Seabee officers and enlisted men get eight to 12 weeks' military training in the use of firearms, tactics, discipline and so on. In the first part of the war they went directly into combat areas from training; now they are assigned to a rear base for some time before moving to the front. In almost every Pacific invasion, however, Seabees have been in the thick of the melee almost as soon as the troops.

Perhaps the greatest asset of the Seabee organization is its flexibility. Like the Army, Seabees are formed into regiments, but their basic unit is the battalion instead of the company. Each battalion is an integral unit, which has an executive officer and five company commanders and is run exactly like a construction gang. A regimental staff does the overall planning, the lay-outs and the designs, then writes the specifications and hands out the work to the battalions. As much as possible within this military framework, the Seabees function with civilian viewpoint and technique. Even the best military organization is inclined to be ponderous and sluggish at times; the Seabees are streamlined to be free of this weakness—capable of rapid fire work at a moment's notice.

The Navy foresaw a need for the Seabees over two years ago. In the Pacific and elsewhere our bases were inadequately prepared and equipped. Public and, therefore, Congressional opinion had been against making any moves that might incur the displeasure of our amiable neighbor, Japan. We marked time and debated while Japan forged the weapons of war.

Some months before Pearl Harbor, however, the Navy's Bureau of Yards and Docks moved to organize a construction group that would be ready for anything. Nucleus of the soon-to-be Seabees was the Navy's Civil Engineering Corps. These engineers were augmented rapidly in a country-wide recruiting campaign. Under the direction of Vice Adm. Ben Morreel, chief of the Bureau of Yards and Docks, and Capt. J. R. Perry, head of the bureau's department of administration and personnel, expert construction men were obtained from private industry and commissioned by the Navy. The new organization was named the Seabees, the title growing out of the letters C. B., standing for Construction Battalion.

That the recruiting program was hugely successful is demonstrated by the fact that the Civil Engineering Corps now have over 800 officers and around 240,000 enlisted men. Among the officers are civil engineers, design experts and assorted mechanical specialists. The enlisted men have ratings like carpenters' mate, electrician's mate, machinists' mate, pharmacists' mate, gunner's mate, commissary clerk, storekeeper and yeoman.

Like the officers, enlistments were chosen solely on the basis of ability. Because of the specialized training both officer and enlisted Seabees had before entering the service, their Navy training was not difficult. An officer who was already an expert in, say, boiler construction was simply given a little instruction in Navy boilers and he was then ready to train his enlisted crews. Again, in the building of Quonset huts, only the officers would receive direct training by the Navy, after which they were expected to train their own crews.

Often supplementing the Seabee military prowess is the fighting spirit of the United States Marines, who make a spe-

(*Continued on page* 261)

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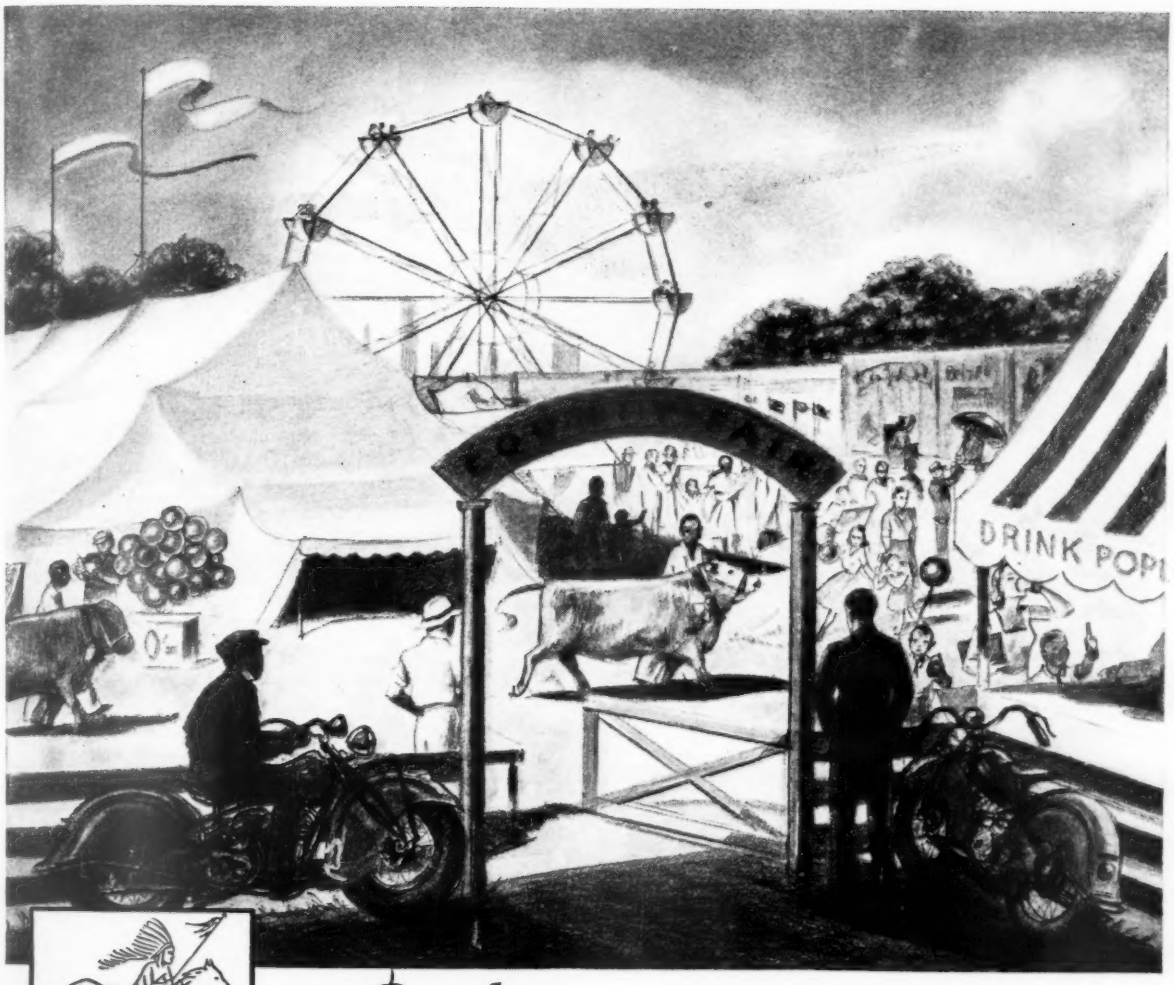

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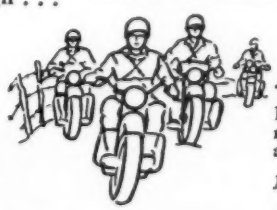

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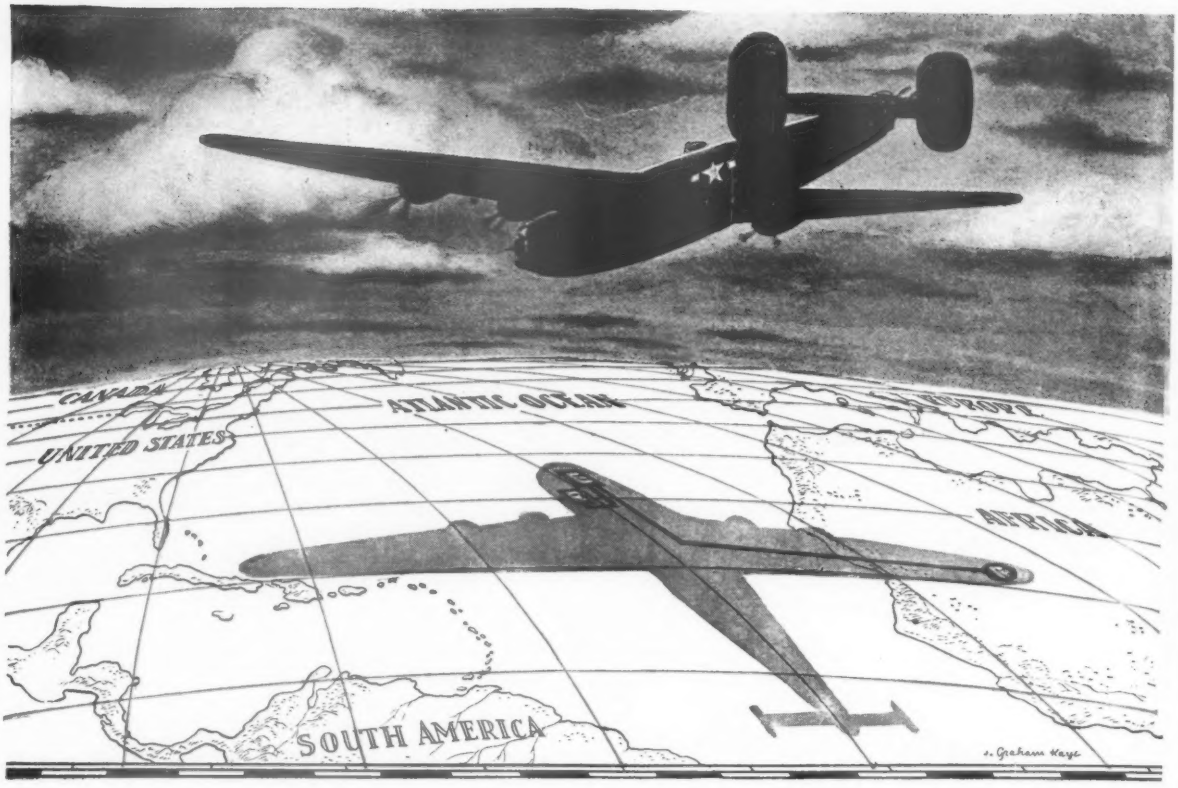

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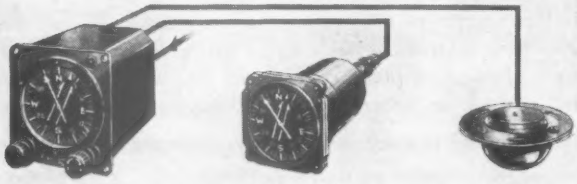

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F — FLUX VALVE — mounted in wing tip. Weighs 20 ounces.

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(*Continued from page 258*)

cialty of looking after the Construction Battalions, in whom they take a kind of fatherly interest. Between the two branches there is a curious affinity, founded on mutual aid agreements. For one thing, the Seabees have been generous about feeding the Marines who, being highly mobile, frequently have an inadequate mess and must rely on the dubious K and C rations. Noted for their good chow, the Seabees feed all the extra personnel they can get into their mess halls.

Perhaps the greatest field of Seabees activity lately has been in the Central Pacific. The pattern in this area has been largely similar to that in the South Pacific, with some variations. Construction of a new island air base is planned in detail before the battalions leave Hawaii with the amphibious force.

Aerial photos and other data have been provided, the location and size of the strip has been decided upon, and each unit has been told exactly where it is to work and what it is to do. The ships are loaded so that the first materials needed on land can be unloaded first. Seabees seldom get things on the beach in even a mild snarl these days.

D-day at Eniwetok was February 17. A few Seabees were on shore by Feb. 22, but the main landing of them was on Feb. 24. Clearing for the strip was started soon afterwards. Because of experience gained in previous campaigns where men were lost to disease, the Seabees constructed mess halls and latrines first. There were quite a few Japs still fighting on the island. One Seabee surveying party, in fact, pushed into a part of the island that had not yet been captured. Coming over a slight rise, it encountered combat troops coming at them on the double. The Seabees dropped, but the voice that shouted at them was speaking in English. "My God, men," a lieutenant cried, "we haven't taken this area yet!" The Seabees accounted for two of the last Japs on Eniwetok. One was flushed by a bulldozer and shot, and the other was caught in a bulldozer blade and knocked unconscious. The bulldozers plough up a good many dud shells and hand grenades. Fortunately at Eniwetok, none of the duds exploded, but it was not uncommon for grenades to be exploded by the machines.

The airfields, of course, are always the first consideration at a new base. There are many tricky problems in their construction. For one thing, some aerial photographs tend to magnify; as a result, in the early invasions the plans turned out to be for a larger strip than the area permitted. Nowadays the Seabees figure the maximum capacity of the island before starting. Formerly, the first calculations of probable plane traffic on the strips were nearly always low.

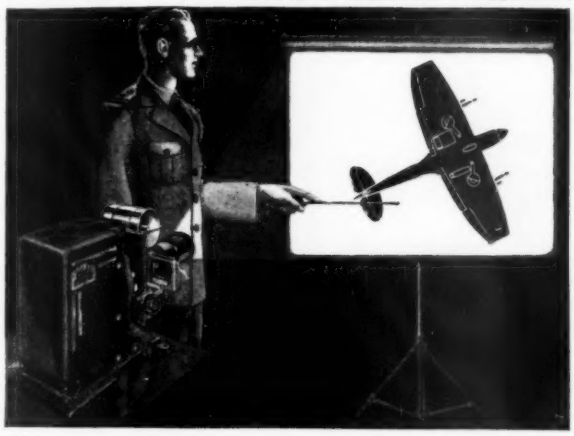
A complication at Eniwetok was the fact that high-grade live coral sand was hard to locate. It was finally blasted from under a ledge three feet deep. For a few days the flying rocks were a real menace; three men were hurt, though none seriously. The wet coral when put on is usually in a soupy state. The secret of getting it down right is to keep it wet, or "cool." The bulldozers level the coral out. Then it is rolled thoroughly and bladed until it is in the desired shape. Thereafter it must be wetted down and rolled continually to keep in working condition. At Eniwetok, Lieut. Comdr. J. A. McAllister of the Seabees estimated that it took 375,000 gallons of water every 24 hours to keep the field in operating condition. Thirteen trucks were working all the time during dry weather.

At other places the Seabees have different materials to work with and different conditions to face. The talk of the Caribbean area is the Maracas Bay Road project, across the mountainous little island of Trinidad, B.W.I. This road is 7.6 miles long through what was previously regarded as "impassable mountains and jungles." It reaches from Port of Spain to the sea and is the only connecting link to our air facilities there. Having been told that the project, because of the rocky character of the terrain, was practically impossible, the Seabees made a photographic survey one day, laid out the route the next, and started the actual work on the third. In two months one of the most beautiful macadam highways in the West Indies was completed.

The Seabees' future is problematical. After the war virtually all the officers will probably return to their high-priced civilian jobs. One Seabee officer at Bougainville paid an income tax of $50,000 the year before he joined the Navy.

All in all, the Seabees look like a phenomenon of World War II and will probably die with it. Commander Clark of Bougainville is in favor of this. "One reason we can get the work

NEEDED IN WORLD WAR I



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done," he says, "is because we have no tradition to bog us down. And if there's another war there should be a new construction gang to start right off from scratch, without having to use our worn-out methods."

In this war, however, the Seabees will doubtless carry on their spectacular work until the gates of Tokyo itself are in view. And wherever they go they will continue to leave mementos of their skill and of the high regard in which they are held by their fighting brothers. There is a signboard along a road at Bougainville which reads: "Marine Drive Hi-way. To our Very Good Friends and Able Protectors, the Fighting Marines, we dedicate this Hi-way—Marine Drive." Built by the NCB, We gratefully acknowledge the help of the 75th CB-Bougainville B.S.I."

A little farther down this road there is another sign, carrying the following cheerful note of prophesy and signed by the "Third Marine Div.—2nd Raider Regiment."

"So when we reach the isle of Japan
With our caps at a jaunty tilt
We'll enter the city of Tokyo
On the roads the Seabees built." END

The Sense Manuals

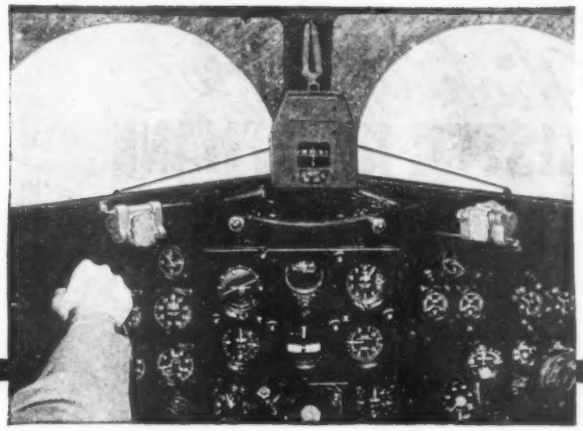
(*Continued from page* 153)

Naval officers. They were not technicians; few of them knew anything about airplanes, and none of them had any illusions about pedagogy, but they could write.

[Authors of the Sense Manuals are a group of Naval Reserve officers attached to the Writer's Unit of the Aviation Training Division under the Deputy Chief of Naval Operations for Air. The unit includes such writers as Lieut. Comdr. Lawrence E. Watkin ("On Borrowed Time"), Lieut. Roark Bradford, author of "Old Man Adam and His Chillun," the book on which "The Green Pastures" was based, Lieut. Robert Lewis Taylor (the New Yorker Magazine), Lieut. Hannibal Coons (Collier's), and Lieut. (jg) Bernard Livingstone (the Associated Press). Recently lost to it for return to civilian status was Lieut. Russell Thackrey, soon to become dean of administration, Kansas State College. Lieut. Comdr. Ed Ehrich (NBC) and Lieut. Comdr. Don Thorburn (advertising copy writer) who were formerly with the unit have been transferred to other Naval aviation activities.

Whatever sort of experience the writer brings with him, he must show that he has the wit and lightness of touch necessary for this specialized writing. The manuals are illustrated with cartoons drawn by Lieut. Comdr. Robert Osborn, whose character "Dilbert" has become a Navy favorite. Lieutenant Commander Osborn's cartoons have added the same gay touches to the Sense Manuals as has distinguished his work on the Dilbert posters. These were evolved for a similar end—sugar-coated education—and used the same lighthearted technique. The Dilbert posters are miniature Sense Manuals in themselves. There are several hundred of them dealing with specific types of planes and specialized subjects.—Ed.]

New Marquette Hydraulic Windshield Wiper



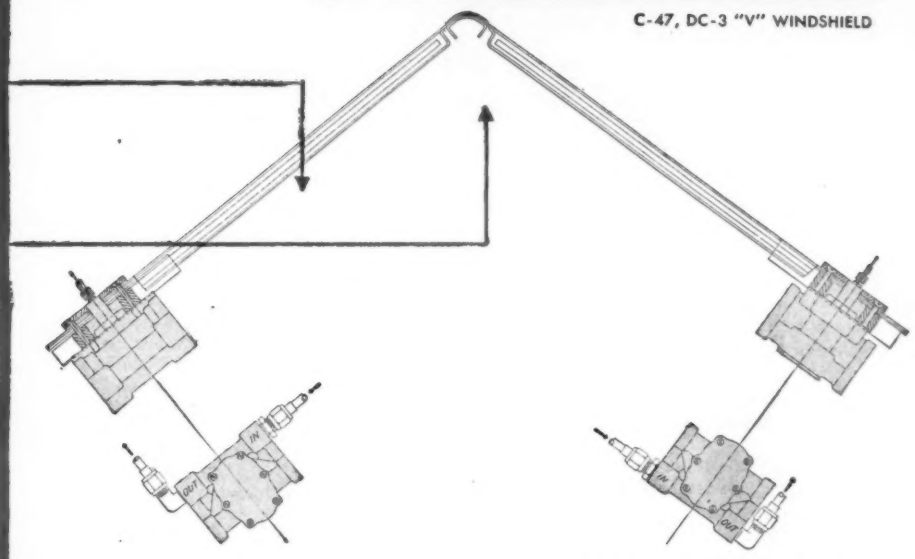
C-47, DC-3 "V" WINDSHIELD

No push-pull controls

No central motive unit

A lighter installation

And less expensive



Cockpit installation. Blades not shown.

● A powerful new hydraulic motor makes it possible to offer a greatly simplified and improved Windshield Wiper assembly. Compared to the earlier models, there are important savings in weight, installation time, maintenance and over-all costs. Convenient installations are easily accomplished. The hydraulic motor, though small, has a high torque, permitting a blade speed up to 400 strokes per minute during flight. It is backed by our long experience in pioneering and producing windshield wipers now used by commercial airlines and on Army and Navy planes.

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HYDRAULIC GOVERNORS FOR DIESEL ENGINES • ROLLER BEARING TEXTILE SPINDLES • FUEL OIL PUMPS
AIR COMPRESSORS • PRECISION PARTS AND ASSEMBLIES

Highlights from LAISTER-KAUFFMANN ...Sunday clinics

Week in, week out, the men and women of the Laister-Kauffmann Aircraft Corporation—from production workers to corporation officers—work, think and live to send more and better gliders to our fighting fronts.

This is THE JOB.

Then, on Sundays, Laister-Kauffmann pilot-engineer-executives go on a busman's holiday at the "L-K Sunday Clinic"—taking up gliders time and again, checking, testing, experimenting until the sun goes down. In spite of the long hours and terrific pace he sets during the week, L-K President Jack Laister, a first rate glider pilot since his high school days, looks forward to these gruelling Sundays.

Visitors at these sessions say there are no words to describe the gyrations L-K men perform in the sturdy Yankee Doodle II. But glidermen on countless military missions—fighting men who never heard of the L-K Sunday Clinics—know that unsurpassed quality is built into every L-K glider. And this L-K group feels well repaid when these "outside" activities result in improvements that directly benefit L-K's war birds, innovations that will one day contribute to the peacetime reputation of Laister-Kauffmann gliders. They know what they're talking about when they say that L-K's Sunday Clinics will shape your Wings for the Future...

Wings of the Future

Laister-Kauffmann Aircraft Corporation

ST. LOUIS (17) MISSOURI

As in all other new projects, there was opposition to the breezy style of the texts prepared by these writers. Many old line Navy men found them "undignified." Died-in-the-wool pedagogues held their noses and looked away, muttering in their best classroom vocabularies: "My (comma) My (comma) Such drivel (exclamation point)." The most intense disapproval of the effort to present knowledge interestingly, perhaps, came from the technical men themselves. They resented seeing the long hours—even months, and sometimes, years—of intensive experiment, study and theorizing, dusted off with a few breezy paragraphs.

One technician used 6,000 words to describe the operation of a gyro compass. His opening sentence, which began, "Since the laws of motion—" had 286 words in it, and there were four such sentences in his first paragraph. In the re-write job, the first thousand words were boiled down to something like this: "The gyro compass is a gadget that might have been invented by Rube Goldberg and could be best described by Gertrude Stein. But he didn't and she won't. However, that gyro will get you home a lot of times when the needle on your magnetic compass is dancing jigs due to local interference. Here is the way it works:"

In a preface to this streamlined course in navigation—which replaced Bowditch and Dutton—Captain Radford wrote: "The somewhat light and, in some cases, unorthodox approach and treatment has been deliberately adopted. Experience has proved its effectiveness in arousing interest and developing an inquisitive frame of mind in the student." The course in navigation was shortened from months to weeks. Naturally, the airman is not as thoroughly trained when he completes the shortened course as he might have been had he taken a whole year of theory and practice, but he can navigate an airplane there and back—which is the only thing required of a navigator in wartime.

Prominent among those things which make the aviation sense manuals distinctive are the Dilbert cartoons. Lieutenant Commander Osborn had made a fine reputation as an artist and teacher of art. He created the goofy, stupid character who blundered at everything he tried. The character was named Dilbert. His gross errors are used to point up the possible mistakes the student aviator will make if he does not keep his wits about him. Dilbert now is famous, of course.

Inconveniences with which the unit has had to deal stem from its newly-converted well-wishers. When the success and popularity of the manuals became assured, some of those most violently opposed to them began to move in, ready to take charge and direct the work.

"These brochures are too good not to have more of them," suggested an officer convert, speaking of the Sense Manuals. "While you have the procedure fresh in your minds, you should prepare a brochure on how to write them so you will be able to repeat the performance over and over again."

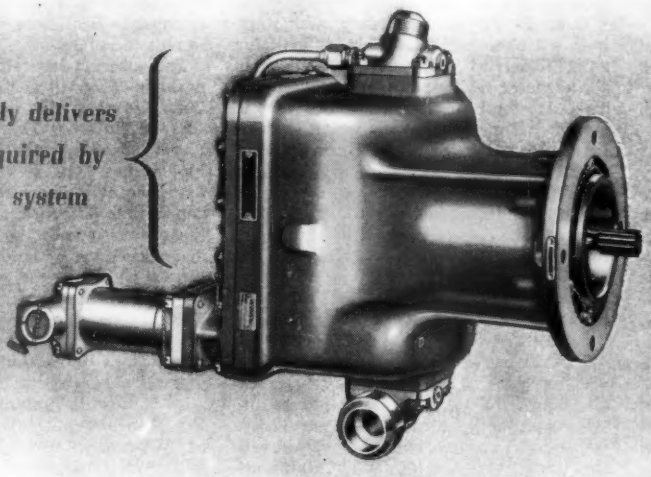
The task of preparing a sense manual on Sense Manual Sense was once assigned to an ensign WAVE in the office, whose civilian writing experience included newspaper reporting and the editing of a magazine on race horses. She also had been a contributor to magazines, ranging from the New Yorker to the Goat Breeder's Guide and Friend. She wrote: "The art of manual writing, as developed by Training Literature is as follows:

"A writer is assigned a title. He immediately sees Major Smith and Commander Jones to acquire the latest official attitude toward the subject. Next comes the business of preparing the background. The library delivers all the printed matter it has. This turns out to be an article in the June 4, 1937, issue of the Saturday Evening Post entitled: "Air Power *versus* Sea Power," by Robert E. Lee Smith III, associate professor of animal husbandry at Mississippi A. & M. College.

"Then comes the period of checking with the Army. You learn they have three manuals on that subject, but unfortunately none of them is available because, on second look, the preparation of the Army's manuals is being held up because they heard the Navy already had prepared the manual, and why duplicate efforts? You then talk to Naval Intelligence, which categorially denies everything and the uniform of the day is Blue B." The work proceeded for 10 or 12 more typewritten pages in a similar vein, winding up with a vaudeville skit in which W. C. Fields and Adolf Hitler argued about the placement of a comma.

HYDRAULIC POWER

FOR *Lockheed* CONSTELLATION



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This Vickers Pump automatically delivers the volume of fluid required by the hydraulic system. When the requirement decreases, the stroke of the pistons is shortened; when more volume is needed, the piston stroke is lengthened. Never is an excess of fluid pumped. The pump *maintains* full pressure in the system at all times with very little horsepower. The variable volume pump eliminates the necessity for the conventional accumulator and unloading valve required when a constant volume pump is used. The variable volume pump is recommended when hydraulic power is used continuously during flight . . . as for the flight control booster system.

As shown by performance curves, volumetric efficiency and overall efficiency are very high. Maximum recommended operating pressure is 1700 psi and maximum recommended speed is 2700 rpm. Maximum hydraulic horsepower output is 15.0 hp at 2700 rpm. The range in pressure necessary to cut volume from maximum to zero can be varied to suit requirements. The maximum pressure is readily adjustable.

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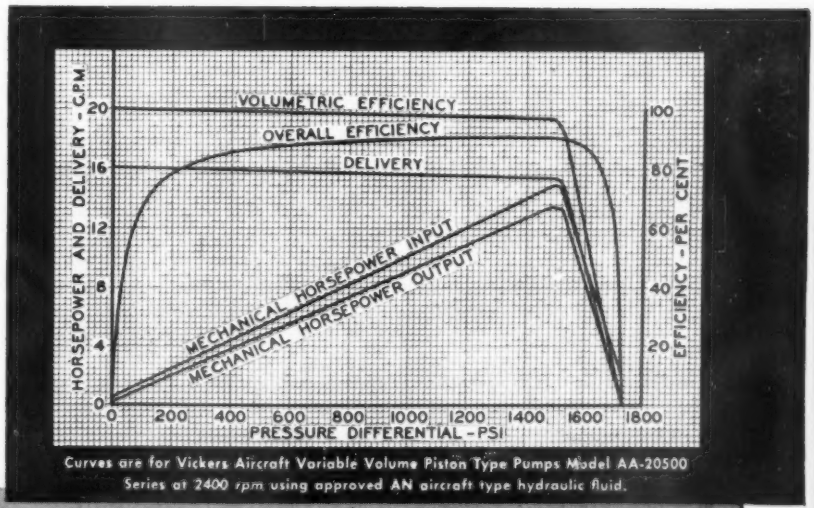

Curves are for Vickers Aircraft Variable Volume Piston Type Pumps Model AA-20500 Series at 2400 rpm using approved AN aircraft type hydraulic fluid.

ENGINEERS AND BUILDERS OF OIL HYDRAULIC EQUIPMENT SINCE 1921

The piece was never printed. Nor, to date, has any other treatise been printed in which there is prescribed a uniform process for the preparation of a manual.

It's not all fun and foolishness, however. It is a real chore to write on technical subjects. Heretofore, most of such writing was done by technicians who knew their subjects thoroughly but who had little or no experience in writing. They produced the wordy, poorly organized and frequently unintelligible texts which made learning so dull. There even grew up a school of thought which held that to disseminate knowledge, the text must be dull and uninteresting. Each profession developed its own jargon.

To know the subject matter for writing a sense manual, the writer must study the available printed material on it. This first step is the toughest one. It involves reading the complicated and frequently foggy technical literature. Next, he discusses the subject with an officer who is an expert. This process enables the writer to form a rational picture of the operations under consideration. Occasionally there is a visit to a combat area where the actual operation is studied first hand. Finally, the writer discusses with the officer in charge of the activity that requested the manual just what points of the subject need to be stressed in the manual.

An example of how the work proceeds may be drawn from the experience of the writer who worked on "Fuel Saving Sense." In this particular case, the writer's most pronounced technical capability was his mastery of the touch system on a typewriter. Such things as 2,000-h.p. internal combustion engine operations, fuel consumption curves, manifold pressure, and a hundred other subject headings had to be learned. This knowledge had to be boiled down to a simple little article which could be read and understood in a half hour's time.

Here is the writer's only advantage over a technician: It is more difficult for a technician to learn to write than it is for a writer to learn a technical subject. This does not imply that the writer is smarter; it means that the writer's training and experience enables him quickly to cut through the inarticulate wordiness of a subject and arrive at the core of it, while the technician's training schools him in laboriously painstaking language that is not conducive to easy expression. This frequently results in long, involved sentences which cloud the truth and confuse the student. Here are examples to illustrate the difference in approach:

From a treatise on landing accidents—prepared by a flight instructor who knew all there was to know about flight instruction but who had done very little writing: "A considerable number of overshooting, undershooting, and spinning accidents occur during circle shots, usually as the result of 'cheating,' which unauthorized maneuvering it is admittedly hard to refrain from, such as 'mushing' or 'ballooning' during these precision landings." On the other hand, a specialized writer got together a piece on safe flying, entitled "Flat-Hatting Sense." He pitched into his subject in this way:

"The line we are going to take in this manual is that flat-hatting is a no-good way to fly. In other words, don't do it. Not only will it get you nowhere, it will get you killed. There are many ways to flat-hat, all of them bad, and we shall attempt to deal here with the most poisonous ones."

The subjects covered by the sense manuals are as varied as the treatments given them. Among the topics included are: The Aleutians, The Arctic, dunking (forced landing technique), flat-hatting, fuel saving, "G," or gravity effects on a flyer, gunnery, manners, the use of oxygen in high altitudes, parachuting, patrolling, security, how to deal with sharks, and procedure of landing and taking off from a carrier.

Most of these publications are circulated freely to all Naval aviation personnel for their general information and enjoyment. One of the most thumb-worn manuals in the recreation hall of a Naval Air Station not many miles from the Brazilian equator is "Arctic Sense," or "What to Do at the Point of an Icicle," while in far-away Attu, where man's most common companion is the polar bear and the williwaw, a favorite is, "Manners Sense," or "Gentlemen, Be Seated." END

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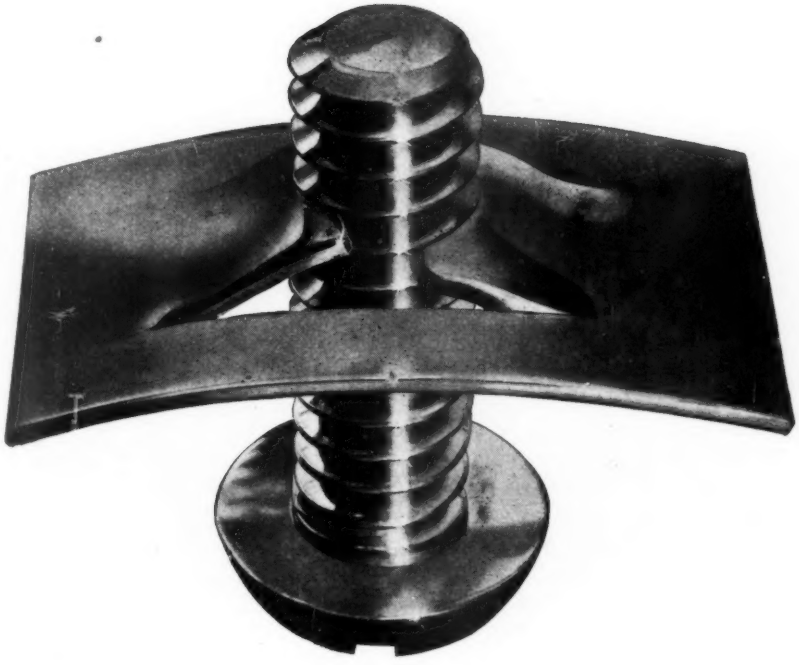

SPEED NUTS join in saluting a great Navy and are proud to serve the fleet ashore, at sea and in the air.

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INVEST IN VICTORY — BUY BONDS

African Wing-Ding

(*Continued from page 154*)

asked blandly. "And his feelings is hurt?"

"Square it up, will you, Chief?" directed the skipper.

"Aye, aye, sir," said the chief.

The next day the chief yeoman at the Admiral's mission was handed a note. Following is an exact copy:

From: Enlisted men, U. S. Navy at N.A.T.S. Facility.

To: Chief Yeoman, Admiral's Mission.

Subject: Dance.

References: (a), Emily Post; (b), Social Register; (c), Navy Register; (d), Society's Blue Book; (e) Blue Jacket's Manual.

1. Scuttlebutt here is that your dignity has been offended because you did not get a written invitation to the enlisted men's dance Saturday night, just like the Admiral.

2. Under references (a), (b), (c) and (d), we hoped to send a special courier down to your office in an admiral's barge, pipe him ashore with Red Cross girls for side boys and have the band play appropriate music while he handed you a specially engraved invitation. But we are fresh out of admiral's barges, couriers, Red Cross girl side boys and engraved invitations, so we have cancelled references (a), (b), (c) and (d). We are now operating under reference (e).

3. We don't see anything in reference (e) that says you are any different from any other enlisted man in the Navy even if you do work for the Admiral. It is an enlisted men s dance. If you can qualify under that classification and are willing to put up two bucks for refreshments like everybody else is doing, it is as much your dance as anybody's.

4. The dance will start at 2100.

The dance did start at 2100. And what a dance! The music was hot. The plywood floor had just enough spring to it. The sand, which inadvertently had blown in, kept everybody from slipping and falling. There was beer from the city. The Admiral and his wife were in the midst of things, having a swell time. Four Red Cross girls came, as did two Army nurses from the hospital. There were stenographers from both the American and British consulates. A dozen or so colonial girls who could carry on a basic conversation and shake an agile sandal were brought in by the station's Romeos. Even five missionary ladies, temporarily stranded at the station while awaiting transportation and consular clearance, came. They disapproved of both beer and dancing but they sat on the sidelines and "chatted the dear boys" until almost midnight.

The Admiral's chief yeoman did not show up. "He missed a good time, too," declared Chief Makrai. "We had it planned to pipe him aboard, with shirt-tailed Wogs (natives) for side boys and to make quite a fuss over him. But I guess his feelings was too hurt, even after that nice official letter we wrote him." He shrugged his shoulders. "Some people get their feelings hurt awfully easy." END

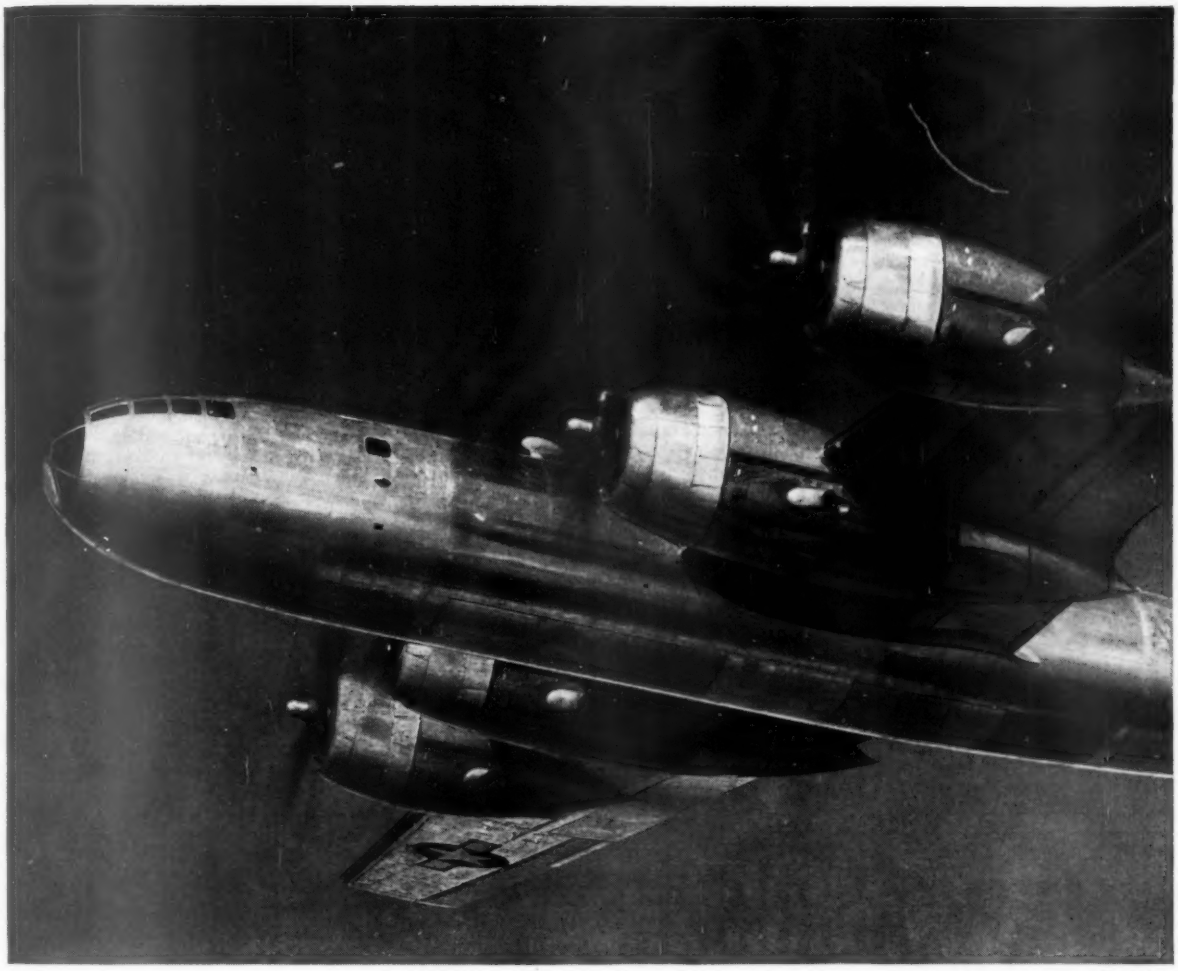
Rehabilitation

(*Continued from page 156*)

Glen Innes was fitted out in a hurry but comfort is its keynote. All the kitchen equipment was made by local metalsmiths, cane furniture was obtained from the New Zealand Institute for the Blind, and double decker beds were installed in the rooms. Altogether they will accommodate 50 men. The living room of the home has soft lights, Persian blue walls, and is constantly gay with flowers that are cut three times a week from the beds of roses, aster and gladioli surrounding the house. As one of the guests, after three days of leisure, remarked to the director, "This seems to be about what we're fighting for." Another boy wrote home, "It was a big hunk of the USA served up to us, and it touched the old heart strings plenty to see American Red Cross girls doing the honors."

Mrs. Haney and her American assistants are particular about the food at Glen Innes. They prepare it American style. New Zealand cooks were painstakingly taught American dishes. New Zealand is primarily a dairy country, so there is plenty of butter, milk, eggs and cheese, and there are always steaks available for the flyers. The boys are encouraged to eat all they possibly can. A good many of them order a breakfast consisting of eggs, steak, ham, hot cakes, and sausage. Afterward they may take a brief nap and then strike out for the day's entertainment. Golf and boating are the leaders in popularity but there are tennis, croquet, badminton and other sports. Lunch and dinner are prodigious meals at Glen Innes and for a late snack Mrs. Haney has filled the pantry refrigerator with dairy dishes, cold meats, and vegetables of all sorts—she encourages the guests to fill up before they go to bed. Ice cream in two flavors is available in any quantity at any time, day or night. As a rule, the average Navy or Marine Corps pilot will be several pounds underweight when he strikes New Zealand. This has usually been gained back, and frequently more, before he returns to the Solomons.

For relaxation in the evenings the Red Cross women have arranged a date list, which includes 50 or so girls from good families in Auckland. It might be added that they are, by design or accident, the prettiest girls in town. Romances have been struck up at Glen Innes that have led to engagement and marriage, and they had nothing at all to do with wartime hysteria. Navy and Marine flyers find the New Zealand girls amazingly versatile—they look as well in evening dress as they do in riding clothes, they dance and sing skillfully, know the latest American songs and are thoroughly conversant with the



Buy War Bonds — to Have and to Hold

The story behind the Boeing Superfortress

Remember back to January, 1940? The war in Europe was not yet five months old and war with Japan still two years away, but the U. S. Army Air Forces even then determined they must have an airplane *that would carry a heavier bomb load farther, faster and higher* than any the world had ever known.

Leading aircraft companies were invited to submit designs.

In February, thirty days before Hitler invaded the Low Countries, the Army radically increased its specifications. Those new requirements made the design problems still more difficult. But Boeing—with its unequaled background of 4-engine experience in building such planes as the Flying Fortress, the Stratoliner and transocean Clippers—was in the best position to solve them.

Wind-tunnel tests of the Boeing model so impressed the Army that Boeing was authorized to build three experimental airplanes. And then — even before the first of these had been completed and flight tested — the Air Forces decided that *this* was the world's number one bomber! Quantity production was ordered — *one of the greatest manufacturing programs ever put behind any weapon of war.* This program eventually included the Bell and Martin plants as well as three Boeing plants and literally hundreds of sub-contractors.

This placed upon Boeing a tremendous responsibility, not only in successfully engineering the design but also getting it into production.

A master plan had to be created . . . factories built . . . new tools designed . . . co-ordination of production arranged in all participating plants.

So sound was the basic design that not one major change had to be made when actual flight tests got under way. And approximately a year and a half later the first production models were bombing Japan.

Superfortresses are taking their place along with the famous Flying Fortresses in Boeing's effort to provide the Army's great bombing crews with the best possible airplanes to accomplish their hazardous and important missions.

DESIGNERS OF THE FLYING FORTRESS • THE NEW B-29 SUPERFORTRESS • THE STRATOLINER • TRANSOCEAN CLIPPERS **BOEING**

arts. If the boys and their dates stay at Glen Innes in the evening, as they nearly always do, the entertainment is informal. Somebody plays the piano and the group sings and dances. Once some Maori tribesmen came out and sang their native songs but they wound up learning "Let Me Call You Sweetheart" and "Pistol Packin' Mama."

The Sydney rest centers are somewhat different from these in New Zealand but are equally effective in putting the boys back in good shape. Sydney is a big city. It has night clubs, expensive restaurants and most of the familiar recreational facilities of an American seaport like San Francisco or New York. Its beaches are exceptionally beautiful and have a peculiar, long rolling surf that makes for good surf-boarding. Guests arriving in Sydney are met by Lieut. Noble Doss, the liaison pre-flight officer there, who arranges for housing and other details of the flyers' recreation period. The Hotel Norwood, for gunners, is just across Sydney's Harbor Bridge. It has a huge porch looking out on the bay.

The Norwood is reputed to have the best meals in Sydney. The officers in Sydney stay in such places as the Bernly Officers Club in King's Cross, and the Hotel Petty, which has been taken over by the Navy.

The rehabilitation directors want to expand the program. They have in mind making the facilities available to more groups of personnel and following the period of complete rest with one of light physical workout and mild training in new tactics. At the moment, the trips to New Zealand and Australia are perhaps the biggest events in the lives of South Pacific flyers. After returning to combat their first three weeks are generally spent in reminiscing about what they did "down under." "Remember," one may say, "when the Abo (aborigine) in Sydney park showed me how to throw the boomerang and I asked him what's the principle and he came out with "Aerodynamics?" During the last days of a combat tour they work up a lot of excitement about the impending rest trip.

The Navy has wisely made the whole business flexible. Each man as far as possible is permitted to spend his time just as he pleases. One pilot fresh from theological school said he was tired of coarse talk. He wanted to spend a week with the most religious family in New Zealand. Lieutenant Cooper searched out a farmer near Aukland who was as pious as an early New Salem puritan. The pilot lived with this family, read the Bible daily, and pitched hay. When he returned to duty he was so filled with good honest religion that he sailed into the Japs and established several new records of destruction.

One non-comformist refused to go south with his squadron. He said he'd thought the whole thing over and would rather spend his week in bed. Except for an occasional meal, he slept uninterruptedly for 150 hours. When the boys came back, he said he'd had the best time of all. END

VJ—Utility

(*Continued from page* 103)

deal of the accurate marksmanship now found throughout the Fleet can be attributed to the monotonous towing hauls of utility squadrons. It is not unlikely for one of these patient pilots to make three four-hour towing hops in a single day, and then go up to repeat the performance the next day. Utility work is unglamorous and attracts relatively few recruits, which means that the squadrons are frequently short-handed and forced to double up on flying time. Also, after several days of inclement weather it is necessary to double flight periods during the sunny period.

Often the Japs spot utility planes and make it hot for them. And now and then a utility plane will make it hot for the Japs. A *Ventura* was once jumped by five Zeros while making a routine reconnaissance flight "up the slot" in the Solomons. The utility crewmen were so pleased at the prospect of action, after a long stint of dull hops, that they turned on the Zeros with glee. Startled at this violent reception, the Japs turned tail for home, one of them streaming smoke from hits in his engine nacelle.

Even the lightly-armed and armored *Ducks* have tangled with Japs, and with surprising success. The rule seems to be that the average Zero pilot is so amazed by belligerence from these little amphibians that he fails to press home a vigorous

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This NEWEST AEROSPHERE (published May 18, 1944) also contains Statistics and a worldwide Buyer's Guide. Keeps you informed on worldwide aeronautics! 1042 8½" x 11½" pages, 897 illustrations.

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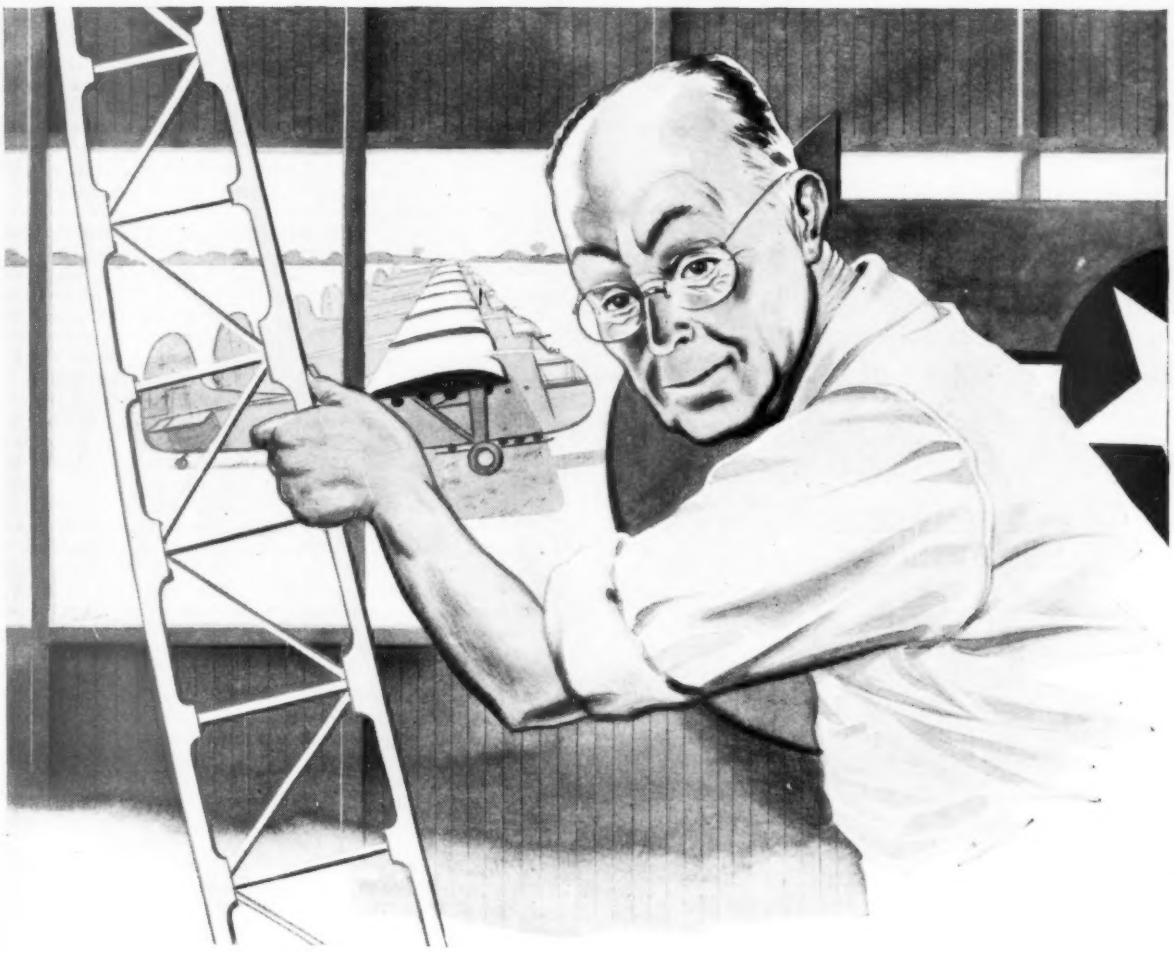

I MAKE BIG ONES OUT OF LITTLE ONES

What do I do?

Well—I take this piece here and glue it to this piece here and I get this piece here. In a manner of speaking, you might say I make big ones out of little ones.

Silly?

Every man's entitled to his own opinion—but I don't think so. You see, it's this way. When you get enough pieces and enough people like me to put 'em together, you get a glider. And when you get enough gliders—you've got two strikes on the other guy.*

Or haven't you read the papers?

**Hours before our liberation forces hit the Normandy beaches, airborne infantry landed behind the lines in* WACO*-designed gliders to establish vital bridge-heads. To provide enough gliders to blaze the victory trail on all fronts, has been* WACO*'s war-time responsibility. Tomorrow,* WACO*'s responsibility—and privilege—will be to continue the* WACO *tradition of better planes for better flying.* THE WACO AIRCRAFT COMPANY, *Troy, Ohio, U. S. A.*

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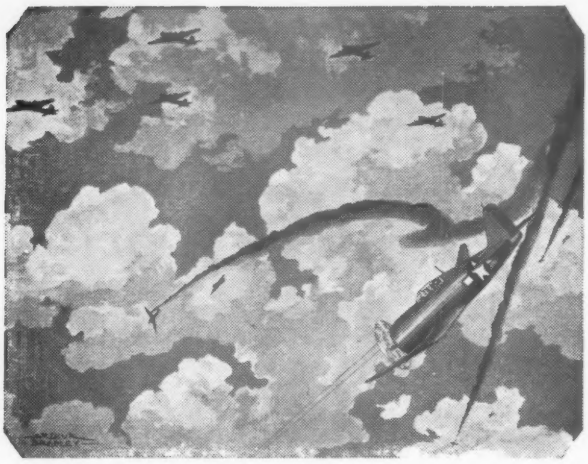

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attack. A utility plane carrying a load of typhoid serum was set upon by a float Zero in the vicinity of Espiritu Santo. Although the Zero had superior speed, the seaplane pilot was able to duck in and out of clouds and shake off the Jap. Every time the Zero got close, the Navy pilot disappeared into a cloud, and every time he came out of the cloud he sent a lively fusillade of lead at the Zero. At length, after losing part of his rudder and a sizable piece of wing, the Jap finally sensed that he was being outsmarted and flapped off toward home. To make the indignity more binding, the utility pilot followed along for several miles, happily but ineffectively working his machine gun.

A more or less unofficial function of the utility squadrons around Espiritu has been hauling fatigued members of the combat group to a nearby island which shall be known here as Uago. On this atoll lives one of the legendary characters of the South Pacific, a man of German descent named Henry Kuper. Formerly a member of the Kaiser's army and now a devout hater of both the Nazis and Japs, Kuper maintains a kind of open house for visiting Allied airmen. Open house at Kuper's, as nearly everybody in the South Pacific knows, means entertainment of a regal order. Having been a successful planter for many years, Kuper has an elaborate residence, numerous servants, and a vast store of drinking liquids, both soft and medium hard. He runs his island as a sort of benevolent autocracy and the natives are thoroughly loyal to him. Kuper is married to a Melanesian-Polynesian who is reputed to be the finest cook in the Solomons. Flyers who seem to be in need of a relaxing week-end but who are not yet due for formal rehabilitation are sometimes flown over to his place. All through the Solomons campaign this kind of job has been very popular with utility crews.

The following report, written to his commanding officer by the radioman of a *Duck* illustrates the kind of utility mission that doesn't turn out to be quite so popular:

"FROM: P. G. Lewis, ARM2C, Utility Squadron Nine Detachment at Efate, N. H.

"TO: Commanding officer.

"SUBJECT: Crash report for J2F-5 [*Duck*] lost at sea 18 Sept. 43.

"At 1645 18th Sept. '43, I was told to make emergency flight in J2F-5 which was to be a rescue mission for pilot and rear seat man of SBD [*Dauntless*] crash earlier in the day whose whereabouts was supposed to be on the island of Tongariki some 60 miles west of Efate, N. H.

"It was 1700 exactly when we took off from mat. The radio gear was functioning correctly on the mat and on take-off. However, very shortly after take-off (app. five min.) the receiver, I. C. S., and all D. C.-operated units ceased to function. This could mean one of several things—fuses, voltage regulator, engine-driven generator or junction boxes.

"When I was busy checking for the trouble, the pilot asked me to look under the lower wings to see if we had any rips in the fabric as some spots looked weak due to the ship being in the weather all the time. As I did, I asked the pilot to check his main fuse panel to see if there were any blown fuses to account for the radio failure.

"Upon looking at the underside of the lower wings I found them to be well intact. At this time, if the landing gear had been all the way down, I could not have helped seeing it.

"I then went top-side to continue trying to fix the radio gear. After some few minutes, my deduction was that the generator was out and thus I could do nothing more in the air after checking fuses, voltage regulator, etc. I then notified the pilot of the condition of the plane's radio.

"At this time (1728) we saw the two *Dauntlesses* flying over the spot where the two survivors were. The pilot checked wind direction and made approach for landing. Since it was to be a water landing, my old habit of asking the pilot if his wheels were down or craning my neck over the side to see if they were down seemed superfluous. The approach was perfect, indicated air speed about 58 knots, as the tail began to slice the surface of the water. Then it came, a terrific crash with an unholy sound as the prop and engine hit the water. As the plane tried to dive into the water it turned completely over. All was silent except for a few bubbles and gurgling sounds.

"Revived by the immersion, I found myself hanging upside down under water in my safety belt. As fast as I could, I

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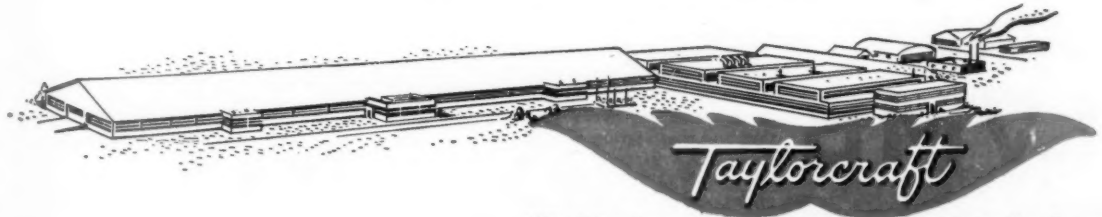
Send us your name and address so you may be among the first to learn the news and details of Taylorcraft's newest developments.



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leave my life jacket because it was fouled. Since I knew I could never swim that far without it, I took my shoes off and swam down under the plane and got it. Only half of it would work as the other half was punctured in the crash, so I had a hard time making much progress for the island. Smith stayed with me and helped me for all of an hour. I hurt my right shoulder in the crash—enough to make such a long swim more than ordinarily difficult.

"About one-half mile off shore some seven to 10 of the better swimmers of the native tribe met us in the water and asked 'You American? You friend. Shake hand.' Well, we shook hands with half the tribe, it seemed. Soon about all I had left above water was my hand. I had very little trouble after they gave me a couple of balsa logs about six to eight inches in diameter and about four feet long. About 25 minutes after this mid-ocean convention we made the rocky beach of Tongariki.

"They took us to their village to the two fellows we were supposed to rescue. The whole tribe wanted to shake hands. Then they made us hot tea—heartily appreciated because of our long exposure in the water. First they gave us green coconut milk when we made the beach. They could talk very little English but seemed to know all our needs. The chief of the tribe sat with us and saw to it that we got some dry clothes and enough to eat.

"They laid out some bunks in one of their grass huts for the four of us and even had one of their big black fellows stand guard all night with a large knife something like a bolo.

"About 2200 we were notified of a boat lying off shore. We went to where they said it was and saw them flash their signal light. One of the natives had a small two-cell flashlight. I borrowed it and began trying to get in touch with them. They saw it and waved me the 'K' to go ahead. I sent them 'FOUR SAFE STANDBY UNTIL MORNING.' They Rogered for the message and sent me 'ANCHORING OFF ISLAND.' I Rogered and we hit the sack.

"The next morning the natives took us down the mountain to the side of the island where the boat was anchored. The whole tribe followed with bananas, coconuts, wild live chickens, mats, hula skirts, and ripe sugar cane, and the fellow who helped me in even tried to give me a big fat swine. Since they seemed very hurt when we would not take something, we took about all the boat would hold. Then the whole tribe gathered round to shake hands with us again.

"The Marine pilot who crashed in the *Dauntless* had a very badly fractured nose and lacerations about the face. This never bothered the natives; the whole tribe shook hands with him as we embarked in the outrigger and dinghy that took us to the boat lying off shore waiting to take us back to our air base at Efate, N. H." END

The Coast Guard

(*Continued from page* 122)

it is possible for the plane to land and offer immediate aid.

In peacetime, the Coast Guard is under the jurisdiction of the Treasury Department but in wartime its direction passes to the Navy. Since November, 1941, the Coast Guard and the Coast Guard aviation have been under the command of the Navy.

Together with the Naval air stations, Coast Guard air bases maintain a constant vigil along the entire coastline of continental United States and Alaska—and for many miles out. There are 10 Coast Guard air stations up and down the Atlantic and Pacific coasts. Although their operations are directed by the Navy, each station is completely manned and operated by Coast Guard personnel. There is also a Coast Guard bomber patrol squadron operating in Greenland. Comdr. Frank A. Leamy is senior pilot and headquarters chief of aviation operations for the Coast Guard, and his job is a heavy one.

Depending upon reports of enemy submarines, of recent torpedoings, or of convoy movements, the Navy maps out each day's duties for every Coast Guard station and that station is responsible for all Naval air activity in its area.

Out on patrol a Coast Guard aviator may be assigned to pick up a convoy and guard it, to hunt for a U-boat reported in his vicinity, or to carry out a general reconnaissance.

For reconnaissance duty the Coast Guard pilot is intensively trained in ship detection. From the air he must be able to determine the type of a vessel from its silhouette and estimate its tonnage. Coast Guard planes challenge unidentified surface vessels with their blinker lights—and the ship in question had better come back quick with the right answers or a Coast Guard cutter or a Navy destroyer will soon heave into sight. Coast Guard pilots have little tricks, too, for spotting and bombing enemy submarines but they must remain a trade secret for the duration. Routine operations present a sufficiently impressive story of teamwork.

The Coast Guard air station operations room is a scene of constant activity. Off to one side the radio operator has his frequencies tuned on the pilot's transmitter, taking his coded messages as they come through at regular intervals. Nearby, up-to-the-minute weather reports keep coming in. On the alert at all times is the Naval air intelligence officer. Meanwhile, over the public address system a Spar will be transmitting orders to the station's personnel.

Coast Guard aviators face flying hazards not often encountered by other airmen. Corrosion from salt water is always a menace to the plane's engines and controls and in wintertime the spray kicked up in a take-off quickly turns into a sheath of ice. Out over the ocean in winter ice

THUNDER OUT OF RUSSIA!

You now see the Red Star of Russia on hundreds of American-built Thunderbolts fighting on the Eastern front. At the controls are daring Russian pilots daily pouring destruction upon Hitler's dwindling hordes.

For the Russians have found that the withering fire from the Thunderbolt's eight 50-caliber machine guns makes it a worthy companion of their own famous Stormovik for ripping tanks, locomotives, fuel dumps and other enemy targets on the ground.

The air forces of England, France and Brazil have also adopted the Thunderbolt as a weapon to suit the demands of many tactical situations—from high altitude fighting to low level strafing and dive bombing. And thus it is that Thunderbolt squadrons are converging upon enemy strongholds from every United Nations front, helping draw ever tighter the noose of ultimate defeat.

The production *in quantity* of this lethal, seven-ton fighting plane continues. The courage and skill of the United Nations pilots who fly it are known and feared in Tokyo as in Berlin. And with these pilots into every battle go the hearts of the thousands here at Republic who are pledged to keep the Thunderbolts rolling until there's nothing left to shoot at—high or low!

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formations are a constant hazard but deicing equipment is not carried because its weight reduces the planes' flying range.

Coast Guard pilots are drawn from the ranks of enlisted men and are trained at the Naval air station at Pensacola, Fla. An intensive program is under way. Upon graduation, a Coast Guardsman becomes an Aviation Pilot First Class and after six months' service qualifies for an ensign's commission. Other aviation personnel in repair, administrative, and general ground duties are afforded commensurate opportunities for advancement.

Not all Coast Guard work is routine, much of it is hazardous. Aboard the Coast Guard cutter *Northland* on duty off the bleak coast of Greenland, a terse radio message came through. An Army *Fortress* had been forced down somewhere on an icecap. Some of its crew were injured and all were stranded.

The Grumman amphibian carried aboard the cutter was readied for flight. Its two-man crew knew that it would be difficult to find the men and to rescue them meant landing on the treacherous ice.

Finally, a message came through to the *Northland*. The *Fortress* had been sighted and the Coast Guard plane had landed on a steeply-pitched slope of the icecap bordered by deep, ravine-like crevasses. A little later the Coast Guard plane radioed that it had taken on two of the survivors and was on its way back to the ship. It landed safely and the men were transferred to the cutter. The same pilot took off again that afternoon, landed successfully, and picked up two more members of the *Fortress* crew. But bad weather was closing in and they struck a mountain in the fog, killing all three men aboard the plane.

For a look at a Coast Guard air station, consider the base at Salem, Mass., from which are flown patrols of the vital Atlantic sea lanes stemming from New England ports. The base is located outside the historic town of Salem and is commanded by Comdr. C. L. Harding. Commander Harding, who was graduated from the Coast Guard Academy in New London, Conn., in 1931, entered Coast Guard aviation in 1934.

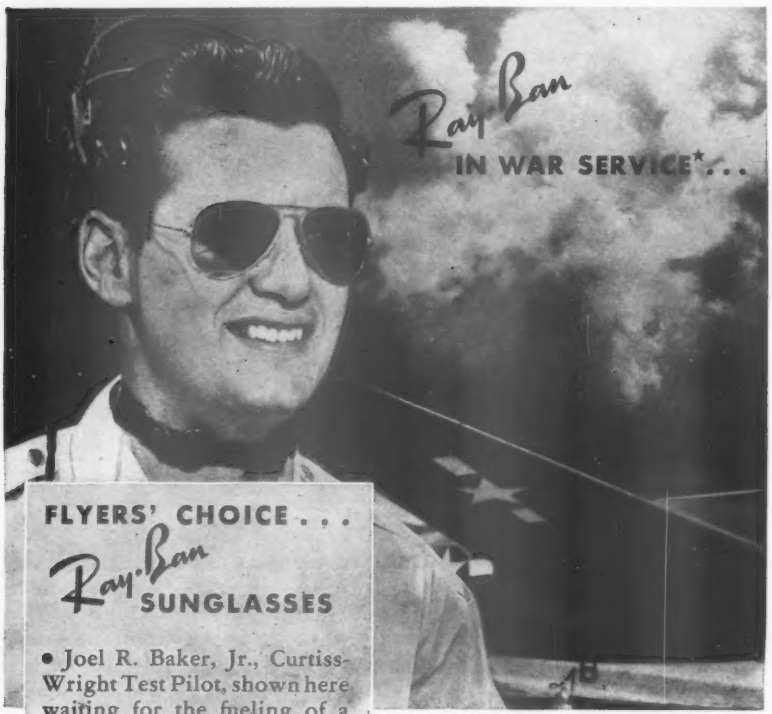
Leading up from the water is a ramp runway running to the operations hangar, which is completely self-contained. In the foreground is the hangar space for the planes, where they are overhauled daily and kept in readiness for the next flight. There is a modern machine shop, a carpenter shop, a propeller shop and a parachute loft—in which sizable overhaul and maintenance jobs can be done. To one side is the operations office and next to that are the pilots' briefing room and armory. An administration building, a mess hall and barracks complete the station.

In a one seven-month period (when its total strength was only about 100 planes and 107 pilots), Coast Guard airmen made more than 6,000 patrol flights, during which some 63,000 surface vessels and 12,000 planes were identified. In that time they flew more than 23,000 hours, covering a distance of almost 2,250,000 miles and patrolling an area eight times as large.

In addition, Coast Guard aviation is continuing its highly important peacetime duties—inspecting aids to navigation, enforcing the U. S. maritime laws, carrying medical supplies to stricken areas, and conducting a flying ambulance service for sick and injured.

A number of Coast Guard air personnel foresee an even greater peacetime task when the war is won. That task, they believe, will be patrolling the transoceanic air lanes, when post-war air travel to and from the United States comes into its own. When and if that happens, Coast Guard planes will be patrolling the skyways much as the Coast Guard cutter fleet now patrols the sea lanes—acting as a sentinel, warning of danger, and rescuing survivors of planes forced down at sea.

Another post-war job of the Coast Guard will be helicopter development. Whatever its future as a general-purpose plane, the helicopter has definite possibilities for Coast Guard rescue work. Because of the Coast Guard's interest in helicopters, the Navy Department has assigned to it all helicopter experimental and developmental work. Today the work is being carried on with small helicopters but as the helicopter is improved and developed the Coast Guard expects to make exhaustive tests with all sizes and types of these aircraft. KND



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• Joel R. Baker, Jr., Curtiss-Wright Test Pilot, shown here waiting for the fueling of a Curtiss Commando, has this to say about flying, and about sunglasses: "I've hung up over 2,000 hours, instructing army cadets and testing pursuit and cargo planes. The ships that get my O.K. go on to the front. They've got to be *right.* And on my job, *my eyes* have to be *right.* I've found the same thing that the boys who fight in American planes all seem to know—up where only a man's best is barely good enough, Bausch & Lomb Ray-Ban lenses set eyes right; they give most comfortable glare protection and sharpest vision."

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Aircrewmen

(*Continued from page 187*)

pilot should do is keep a steady course and give the gunner a good platform, depending on him to take care of the enemy with good shooting." The Japs have finally learned that the four power-operated .50-caliber turrets of a closely formed torpedo bomber division are capable of throwing out a discouraging screen of bullets. Only those most anxious to die for the Emperor attempt to pierce it. Even a two-plane section can produce an astounding amount of .50-caliber fire. The Japs much prefer attacking a lone straggler with two or more of their planes.

At Saipan Lieut. (jg) John D. Slighton, Anna, Ill., found himself beset by three Japs after the *Avenger* he piloted had rammed a torpedo into the side of a Jap carrier. A *Tony*—Jap fighter type—made an attack from underneath in spite of the fact that they were within 300 feet of the water. Gunner Richard Paruso, ARM2c of Dayton, O., opened up with the tunnel gun and the *Tony* knocked off. A *Zeke* appeared in the scene and made two overhead runs but each time broke off in the face of the turret gun fire of August Whitman, Jr., AOM2c, Louisville, Ky. As the *Zeke* prepared for a third run, a *Hellcat* fighter intervened and shot it down.

The old Navy torpedo planes, the Douglas *Devastators*, had no tail gun and Japanese pilots became very fond of making a low side approach from the rear. In the newer *Avenger*, the stinger which the radioman operates during an attack had made this angle of approach exceedingly unpopular with the enemy. Anti-aircraft fire constitutes the chief combat danger to the aircrewman as it does to the pilot. The fighter pilot's primary responsibility is to keep enemy fighters away from bombing and torpedo planes. They usually accomplish that objective. The Skull-and-Crossbones fighter squadron, for example, escorted bombers on nearly 40 strikes during its tour of duty and no bomber under its escort was shot down by an enemy plane. Fighters of one air group had a similar record in protecting bombers on 31 strikes. The bombing squadron of that group came through its entire tour of duty without either a single aircrewman or pilot casuality. In 47 strikes of a bombing squadron, consisting of *Dauntlesses* and *Avengers*, there were no personnel losses of any kind.

Enemy aircraft are not the only obstacle to be overcome in a successful bombing mission. Effective torpedo dropping or bomb placement requires many seconds of undistracted, steady flying while the pilot lines up his sights. It is at this point, and on withdrawal, that the plane is most vulnerable to enemy anti-aircraft fire. While a heavy AA installation cannot be permanently damaged by machine gun fire, well-directed .50-caliber slugs can kill, scatter or demoralize enough of a gun's personnel to put it out of commission during attack.

Most people at some time or other have wished for eyes in the backs of their heads and no one needs them more than the pilot of a combat plane. The aircrewman supplies this essential need. On long searches he keeps a vigilant watch on the horizon and in an actual attack he is usually the only one in a position to observe bomb or torpedo hits. Also, the aircrewman may have a better opportunity than the pilot for noting the exact disposition and types of planes in an enemy formation. The crewman's role as "eyes for the pilot" is particularly important in formation flying, when the pilot has to keep in formation and also watch ahead.

An alert crewman keeps a check on friendly planes, reports stragglers or men forced down, watches for enemy planes, and in general observes everything possible that will help the pilot.

"If your pilot isn't flying right, you should watch and tell him," commented one aircrewman. "He has a lot on his mind and can't possibly see everything the crewman can see." The radioman-gunner has many vital duties to perform in addition to manning a machine gun. Many alert operators have made minor repairs on their equipment while the plane was in the air. Because of silence orders in a task force, the radioman frequently can't open up on the transmitter for tuning purposes until a few seconds before the message is to be sent. Consequently, many radiomen have raced against time as they twiddled the tuning adjustments in the air while the pilot waited to send a message which might affect the whole future course of an operation. The radioman may tap out a coded message in the heat of a battle while the pilot is trying to evade enemy planes intent on shooting the plane down to keep the message from getting off. Communications, however, are only part of the radioman's job. The carrier plane has many complicated radio aids to navigation which permit finding a pin-point target miles from the plane's seagoing base and—equally important—finding the carrier again on the journey home. Under pre-dawn or low-visibility conditions, the operation of navigational aids may constitute a full-time duty for the radioman.

The work of the aircrewman is admittedly more dangerous than that of the average ship-bound sailor but it has a great many compensations. The crewman usually has better sleeping quarters than the rest of the enlisted personnel; also, he has his own air-conditioned ready room. The crewman gets 50 per cent increase in pay because of his flight status, and is not ordinarily required to do any ship's work except maintain his own plane in cooperation with the air department mechanics. He considers it a point of honor to keep his guns in perfect condition; not to do this is the unforgivable sin among crewmen. Ashore, the aircrewman wears a distinctive pair of wings which set him apart from the other enlisted men of the Navy.

Aside from material considerations, the job of being an aircrewman attracts many of the Navy's best men for the simple pa-

(*Continued on page 282*)

An Eternity of Twenty Seconds

WHAT caused the ship to explode no one will ever know. One moment the bombardier was peering down at England three miles below—an instant later he was enveloped in a flash of flame and the B24 Liberator was breaking up in midair. He dived through the door in the nose compartment but his parachute caught on a cable and he hung, fighting desperately to climb back as the disintegrating ship plummeted down. Somehow he managed to pull himself up far enough to free the cable from his chute and dropped—now less than 1,000 feet from the ground. He landed hurt, but safe—one of only two survivors out of the crew of ten.

Before his enlistment, this bombardier was one of our younger employees in our Replacement Parts Division, typical of the fine type of up-and-coming American boys who are hand-picked by Thompson for training and development into positions of trust and responsibility.

In a letter to his former department head, he says, "Only by the grace of God I escaped. *The shock of the loss of those wonderful companions in our crew, I can't get out of my mind. Their screams still ring in my ears . . . I wish the people back home could realize the terrific turnover of materiel and supplies over here. Maybe then we wouldn't read some of the things that make us wonder . . .*"

The workers at Thompson truly have had a part in every bombing raid their former fellow worker has flown, for many of the 1,000 different aircraft parts and accessories made by Thompson go into the American Liberators, Fortresses and the U. S. fighting planes that fly with them as protection on their missions. *Since Pearl Harbor not one hour's production time has been lost.*

Yet, all we may do is so little compared to the risks, the sufferings and sacrifices our boys overseas are making. Someday we shall welcome these boys back. Only by giving them every ounce of support now can we then look them in the eye and grip their hands in honesty and sincerity.

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'Til Victory's won, this work comes first. So if you have to wait for Bulova Watches, please be patient.

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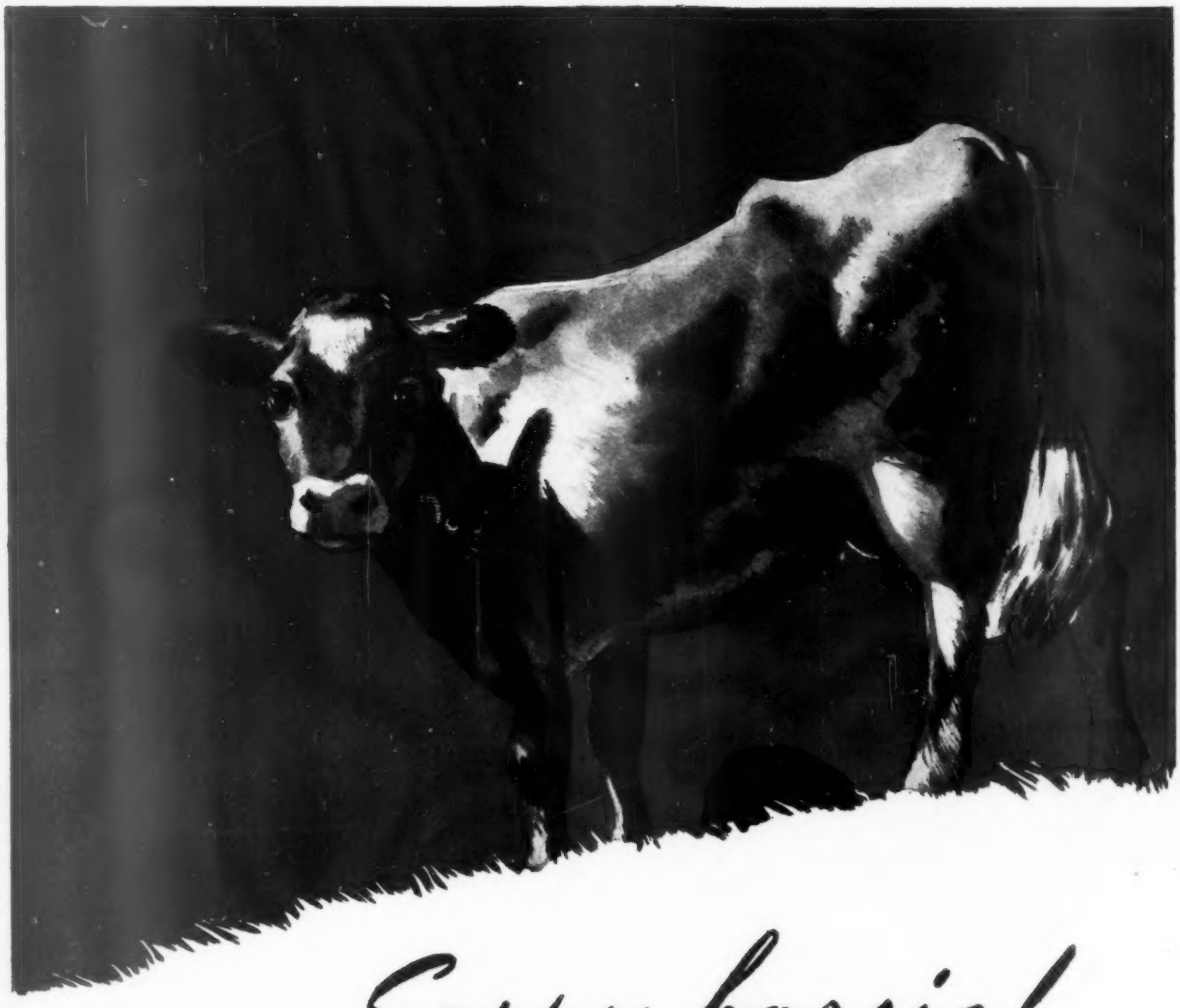

. Sorry, bossie!

Sorry that we have to encroach on your domain, bossie. But such is life. Things have to make way for progress and your favorite cow pasture, small though it is, will be an air field for feeder line service one of these days. We're working on this idea here at Fletcher—a plane that will carry a good payload (convertible for passengers or cargo) at a reasonable speed, and that can get in and out of your cow pasture. If you know some folks that are interested, you might suggest that they drop us a line.

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(Continued from page 278)

triotic reason that it gives them such an excellent opportunity to get in visibly destructive licks at the enemy. The thrill of sweeping low over a Jap-held island and seeing your bomb smash an important installation is hardly to be excelled.

However, radioman-gunner George E. Kapotas probably equalled it in one of the extra-curricular episodes that fall to the lot of the rear seat men now and then. With his pilot, Kapotas took off in a Navy dive bomber for a mission against Kwajalein Atoll. Flying through the heaviest antiaircraft fire his squadron had ever encountered, the plane was struck by a shell which tore through the floor of the front cockpit. The pilot was badly wounded in the thigh and his metal seat was torn so jaggedly he was unable to sit on it; he had to cling to the sides and hold himself up.

Unable to fly in this position, he signalled to Kapotas for help. Kapotas had never flown a plane before but he had been interested enough to study how it was done. He took over the controls just in time to keep the plane from going into a spin. Three-quarters of an hour later he was in the landing circle above their carrier.

But now he was faced with a real problem—landing a plane on a carrier is a job for an expert and experienced flyer. By good fortune the pilot, despite a dangerous loss of blood, summoned enough strength to take the controls briefly and he brought them down safely. The minute the plane hit the deck he slumped over unconscious.

The whole episode is just another fine example of Navy teamwork, and of rear seat men doing their job "above and beyond the call of duty." END

SCAT

(Continued from page 119)

The ambulances pull up to the side of the field and wait. When the plane comes down, making as gentle a landing as possible, the ambulances drive up to the side of the plane, the nurse or corpsman aboard opens a side door, and the work of transferring the sick and wounded from plane to ambulance begins. It is a silent operation. Often the plane crew—two pilots, navigator, flight engineer, and radio operator—help in lifting the litters out. The wounded men seldom say anything. Occasionally a man in comparatively good shape will ask for a cigaret. All are invariably in good humor.

The transfer completed, the ambulances drive carefully over the coral roads to one of the base hospitals at Espiritu and things quiet down until the next plane arrives. The operations men start talking again about wrenches and screw drivers and that box of radar stuff for Vella Lavella.

By no means have all the men in the litters fallen to enemy gunfire. Many are simply sick. Most of the South Pacific sick have been stricken by malaria in some God-forsaken place where the control crews haven't yet had a chance to fight the mosquito. Some of the men have dysentery, some have dengue fever—also contracted from the bite of a mosquito. There are many other diseases in the South Pacific that temporarily knock men out. Occasionally, too, a wounded man comes through bearing a rueful and somewhat ashamed smile; he has, perhaps, cut his hand opening a can of beer.

South of Espiritu, SCAT has a more pleasant duty affecting the health of our men. The recuperative centers for our flyers are in New Zealand and Australia. Here, in settings blissfully reminiscent of American country clubs, Allied flyers rest from their combat chores with all the good things of life at the crook of a finger. SCAT flies these weary men down and dumps them into the lap of luxury, and two weeks later flies them back, tanned and rested.

SCAT'S record in safely handling our sick and wounded is almost unbelievable. In handling over 24,000 casualties, not one wounded or ill person has been lost in a SCAT plane in transit. There have been times when the *Skytrains* have been forced to crash-land in the water, but each time every wounded person aboard was either safely paddled to shore or safely transferred to a rescuing *Catalina*.

Every SCAT plane carrying casualties also carries Army nurses, or Army or Navy corpsmen. The Army nurses have been out in the South Pacific for more than a year and are just now beginning to get furloughs and occasional replacements. Aboard the SCAT planes the nurses and corpsmen carry sulfa drugs, plasma and saline solutions, and every available variety of emergency first aid equipment. In addition to the benefits of such actual medical attention, the mere presence of the nurses seems to help.

SCAT flies landplanes, although most of the 60,000 miles flown every day are over water. They fly *Skytrains* as the most efficient cargo-carrying planes they can find. There has been some agitation in favor of changing over to flying boats, but so far nothing has come of it.

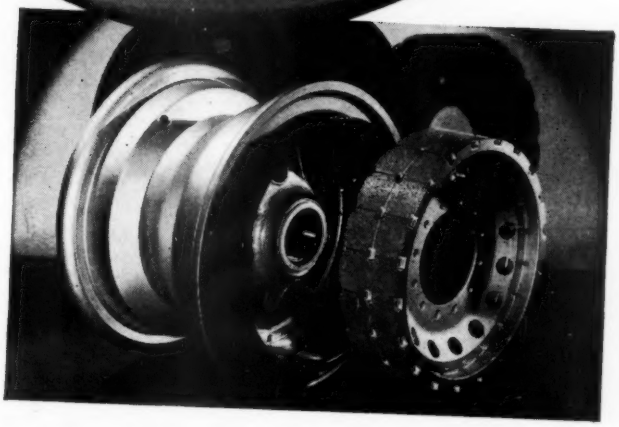
The SCAT pilots average from 100 to 160 hours of flight a month and almost half of this schedule will be on instruments. Darkness, rain, clouds and haze are constant flying companions and things are often enlivened by such weather novelties as typhoons and waterspouts. An actual hurricane grounds even a SCAT plane, but the pilots and operations men stand in the door of the aerological shack like whippets at a barrier and the moment the worst of it is over they're off.

SCAT pilots have won battles and saved thousands of lives by taking off when men less bold would have stayed on the ground.

Complicating the whole situation is the lack of proper aerological information and the almost total lack of emergency landing fields. What aerologists there are in the area are kept busy at the far-flung operating bases and only scattered reports from occasional surface ships are avail-

(Continued on page 286)

PROVING GROUND



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Seaplane Tenders

(*Continued from page* 186)

fore they could swoop down on their virtually helpless prey, however, four Marine fighters flashed out of the sky and sent them down in flames. That was the final enemy threat. By the next morning the flooding had been brought under control, the fire had died out, and a tug had arrived to tow the *Chincoteague* safely to a base. The tug also picked up 16 men who had been left in the bay to finish refueling the last three planes the day before.

The *Chincoteague* long since has been repaired and has resumed her job. The account of her action is cited as one experience in the life of only one of the Navy's many seaplane tenders—those tough, daring little ships which hardly have been noticed by correspondents understandably more impressed by the majesty of the mighty aircraft carriers and the thrilling exploits of fighters, scout-bombers, and the hard-hitting torpedo planes.

Four classes of ships have been used as seaplane tenders. The first was converted World War I minesweepers, which were little more than seagoing tugs. These little 840-ton ships, referred to as the "Bird type" because they all bore names of birds, were used in 1918 and 1919 to remove the thousands of mines with which the Allies had blocked the German U-boats from the northern exit of the North Sea. Minesweeping gear was removed, gasoline tanks were added and provisions were made for berthing and messing aviation personnel. These rugged little Birds steamed thousands of miles at their dazzling top speed of 10 knots.

When the increasing size of patrol planes outgrew the facilities of the Bird-type vessels, no other type of ship was immediately available to replace them. As a temporary substitute, World War I destroyers were converted to tenders and designated AVD's. They possessed advantages over the ex-minesweepers in gasoline capacity and in the number of aviation personnel that could be accommodated, but they did not afford sufficient facilities to warrant their being retained in such service. For one thing, their anti-aircraft firepower didn't give them much protection. One skipper reported after a noisy engagement with Japanese planes in the South Pacific: "The Japs can't hit a bull with a fiddle. Neither can we."

During their life, however, the AVD's filled an urgent need and performed many valuable services. This was true particularly of their operations in the Aleutians and the North Atlantic and South Pacific areas. Although they could base only a few planes and service them only for a limited time, they did have the priceless virtue of high speed.

With combat zones changing constantly in the various theaters, often it was necessary and desirable to use AVD's for other urgent tasks. As the situation in the South Pacific began to develop in our favor they were employed frequently for rapid transport of badly needed supplies, materiel and personnel. Occasionally they were used as improvised hospital transports for the evacuation of men wounded in action, and more rarely for anti-submarine warfare. The destruction of more than one submarine has been credited to these capable and deadly little ships.

After the AVD's had demonstrated the possibilities of seaplane tenders as a class, Naval constructors developed a ship designed for the sole purpose of providing a small, fast, mobile base for patrol planes. Many ideas contributed by commanders of the old converted minesweepers and destroyers were incorporated in the new design. The result was the tender designated AVP, having the speed of a patrol ship, the armament of a destroyer, the communication facilities of a cruiser, a limited fuel capacity and a small but efficient machine shop.

These 1,695-ton vessels, first commissioned in 1941 and 1942, were named for bays and inlets. In addition to their primary duties they have been used with excellent results as escorts, anti-submarine ships, rescue vessels, and supply ships. While they are not considered expendable, area commanders frequently take chances with them which would not be taken with a more valuable ship less able to defend itself.

The fourth class of seaplane tender is the AV. These vessels, of 8,000 to 12,000 tons, have all the advantages of AVP's and other advantages due to their larger size. They are capable of tending as many as 24 patrol planes over long periods. Their shop facilities are extensive, permitting them to make engine overhauls, repairs of wings and hulls, and adjustments of the complicated instruments and accessories vital to the successful operation of big flying boats. They can hoist planes aboard and this, in combination with other qualifications, enables them to make major repairs to damaged aircraft which otherwise might be out of service for months, if not lost permanently. Their larger size affords better facilities for rest and relaxation of pilots and flight crews after long, tiring missions.

The old *Langley*, which started life as a collier, then was converted into an aircraft carrier, finally was reconverted into an AV. She was sunk by enemy action south of Java in February, 1942. The *Curtiss* was the first AV built for the purpose. Her keel was laid in 1937 and she was commissioned in 1940.

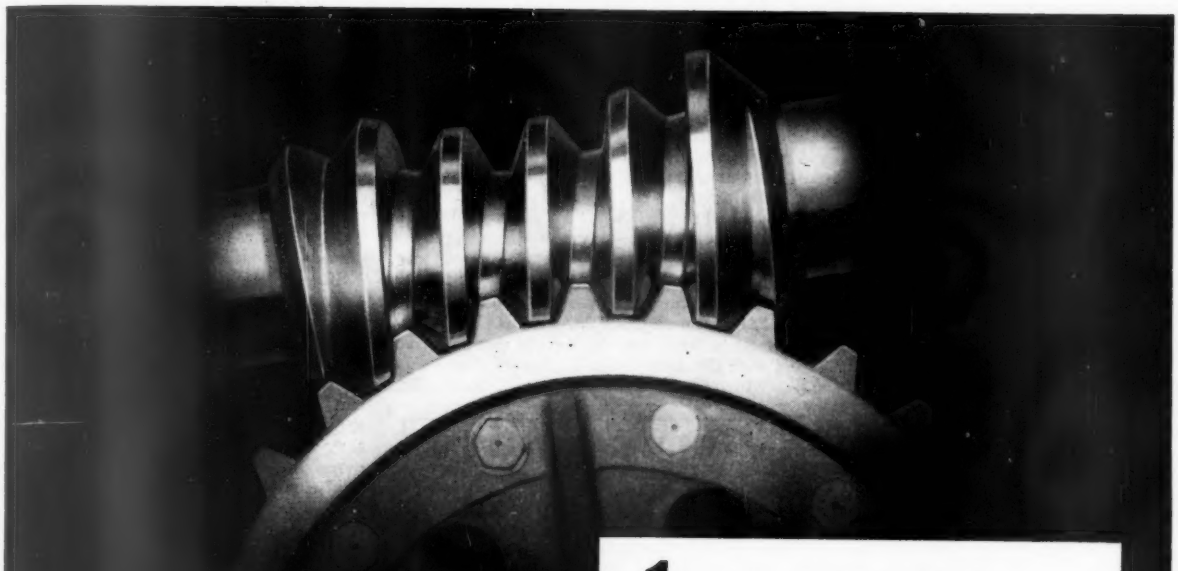
Duty aboard a seaplane tender is a hard school but a good one. It is an independent kind of duty. Often the commanding officer is not only the senior officer present, but the only officer present. This puts young seaplane-tender skippers in positions to make decisions which normally would be made by older heads much higher in the chain of command and therefore is considered excellent training in ship handling and seamanship for Naval aviators possibly destined ultimately to command first-line aircraft carriers. In fact, many of the big flat-tops today are commanded by officers who received preliminary training in seaplane tenders.

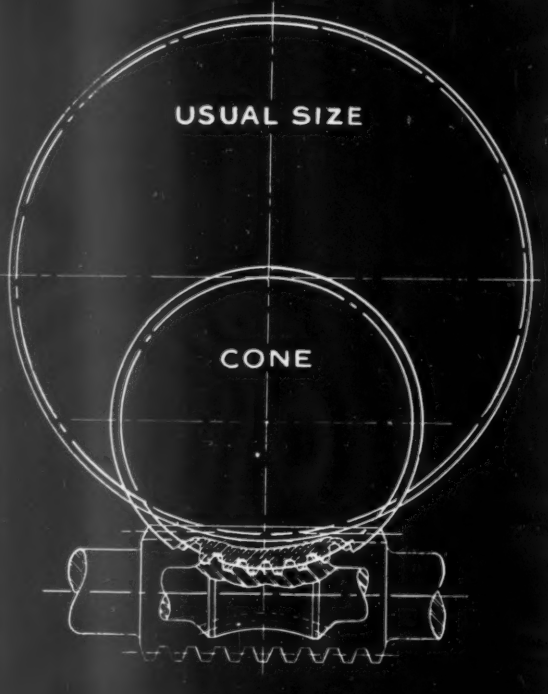
The same sort of independent spirit and willingness to accept responsibility that makes tender duty such good training for officers, prevails also among the enlisted men of that branch. One sailor was heard to remark to another, "I like this duty because I'm the executive type." Asked what he meant, he explained, "All I want to know is 'Yes' or 'No.'" Officers who have commanded crews of seaplane tenders say this is a typical attitude. All such a sailor wants to know is whether a certain job should be done. If it should, he proceeds with confidence in his abilitiy to do it, even if he has to improvise methods to overcome unusual difficulties. He doesn't want or require detailed instructions as to just how each step should be accomplished. He is thoroughly qualified to exercise initiative on his own.

A seaplane tender charged with establishing a forward base customarily precedes its planes into the desired zone of activity. Its first job is to find a sheltered stretch of water smooth enough for the landings and take-offs of heavily loaded aircraft, where the tender itself can anchor with a reasonable degree of security. In selecting an anchorage, consideration must be given to the possibility of exposure to enemy submarine or air attacks, although this possibility cannot be eliminated completely in the coral atolls of the South Pacific or at the anchorages available in the now relatively-safe Aleutian Islands.

After an anchorage has been selected, seaplane moorings are placed by small boats from the ship. They are located with such factors in mind as accessibility, protection from weather and heavy seas, and protection from enemy air action. When the patrol planes arrive and tie up to the mooring-buoys, small boats from the tender stand ready to take off the flying personnel and start the job of refueling, rearming, and in necessary cases repairing the aircraft. Specialized mechanics are put aboard the planes to make repairs and adjustments to equipment. These men have pride in their work and especially in their ability to keep the planes flying. Often they work all night to prepare flights for dawn take-offs on day-long search missions, then turn around and work all day to get the Black Cats ready for their deadly work that night.

While the maintenance crews are working on the planes, the pilots and flight crews are taken aboard the tender for food, rest, and sleep; for interviews about the accomplishments of the completed mission and, eventually, for briefing concerning the next mission. Every effort is made to make them comfortable and to refresh them for their coming duties. Many pilots actually prefer being based aboard a tender, despite the minor inconveniences of a small ship, to operating out of one of the big shore establishments with its accommodations comparable to good "States-side" hotels. END





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(*Continued from page 282*)

able to guide the SCAT pilots across the vast stretches of ocean between. The lack of emergency landing fields is inevitable. The jungle jealously guards any vagrant island that sticks out of water and most of the islands are entirely surrounded by reefs; even the sea can't get in to prepare a beach landing strip. There are practically no beaches; there is water and jungle. Our military engineers are kept busy building new vitally-needed landing strips, there is no time to scrape the resisting jungle off some tiny island where a SCAT pilot *might* want to land in an emergency.

In addition to their other difficulties, SCAT planes get shot at by both Jap planes and Jap antiaircraft. The SCAT pilots are accompanied by fighter planes when the going is expected to be particularly boisterous. On July 16, 1943, during the battle for Munda, SCAT planes went right in under continuous Jap fire and completed cargo deliveries after their protecting fighters had left them for other missions. SCAT later evacuated all Jap prisoners from Munda. It is a very versatile airline.

Head man of SCAT is Marine Col. A. C. Koonce. Under him the Army planes (the 403rd Troop Carrier Command) are commanded by Lieut. Col. H. J. Sands, and the Marine planes (Marine Air Group 25) by Lieut. Col. W. A. Willis. The Army planes involved should not be confused with the Army's Air Transport Command, which is the Army version of the NATS.

The little hut that houses these commanding officers at Espiritu often vibrates with the urgency of the work going on within. When the Navy's *Avengers* suddenly had to be armed with rockets to conquer the Jap at Bougainville, 24 hastily-gathered SCAT planes flew 50,000 pounds of rockets and rocket equipment from Espiritu up to Bougainville in one day. In January of this year, with 73 planes, SCAT flew 25,000 passengers, 3,850,000 pounds of cargo, and 1,250,000 pounds of mail.

SCAT planes are equipped for practically any duty you can imagine, including one for which they are no longer used, the carrying of paratroopers. Paratroopers are no longer considered practical in the South Pacific area. Down there they can be carried and can be dropped, but they can't be found again. Neither can they find each other. The jungle is so dense that when you drop a man into it you usually have dropped a man from the payroll.

However, SCAT still drops a tremendous quantity of supplies by parachute. Even much of this is lost but the percentage that lands in the tiny clearings has saved many lives of ground troops sweating it out in the jungle.

SCAT's newest assignment is convoying flights of fighter planes being flown up to the various combat areas. Fighters are not equipped to do the precise job of navigating. Now the new fighter planes are made up into airborne convoys, a SCAT plane takes off to play mother duck, and off they go across the water. They now get where they're going. SCAT has established the habit of reaching assigned destinations. END

VSO—Scout Observation

(*Continued from page 62*)

they had been through the last war.

Lieutenant Coughlin served his apprenticeship while the U.S.S. *Philadelphia* escorted convoys to England and Iceland. Sailors worked like demons on a tossing cruiser to bring a plane aboard before it was smashed to bits against a steel hull. Under these conditions the old SOC proved its worth. On one occasion Lieutenant Coughlin, dragging the plane in for a landing right up against the stern of the *Philadelphia*, missed the top of a wave, hit hard in the trough, and bounced right over the ship.

After taking many convoys through safely, SO pilots returned to study amphibious warfare and prepare for the invasion of North Africa.

Amateurs going into their first battle, Lieutenant Coughlin and his comrades learned that the little port of Safi, just south of Casablanca, was the first objective of their task force. At dawn the SO planes were catapulted into the air and in the days that followed found themselves on duty from 10 to 15 hours daily, directing the ship's gunfire, spotting airports and enemy troops, carrying messages between ship and shore, from ship to ship, and up and down the beaches for the Army. Sub-hunting also was good. On the second morning of the invasion,

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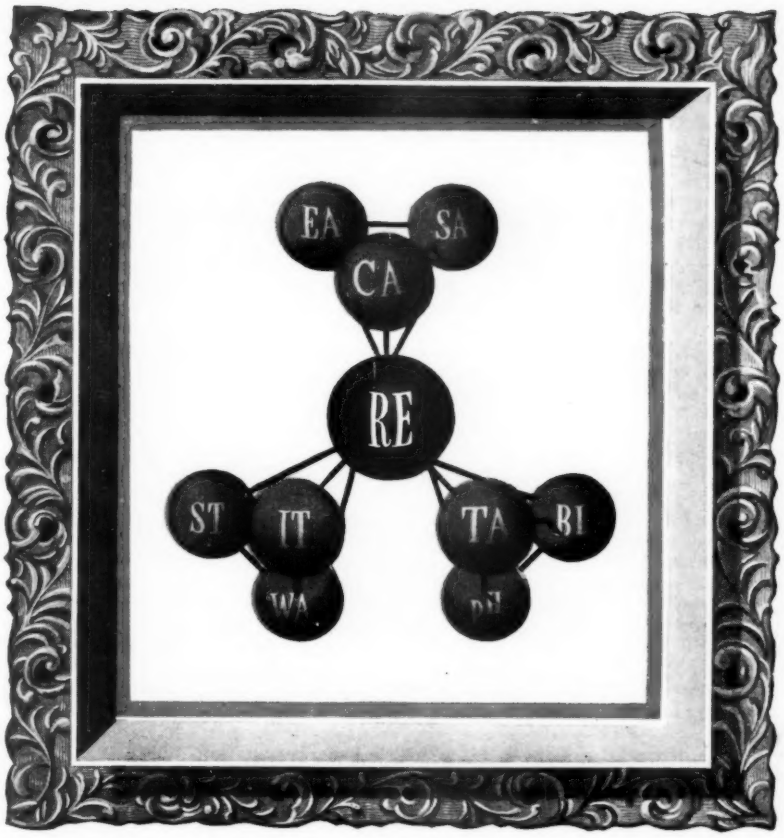

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BI —*buffer index measures the ability to absorb acid soil to prolong solution life.*

IT —*interfacial tension is reduced to permit the spreading of the cleaning solution over oily surfaces.*

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Lieutenant Coughlin bombed an enemy U-boat lying so close to the water's edge that the surf was breaking over her. The sub was beached.

Official reports credit the scout-observation planes with "invaluable service" during the opening days of the invasion of North Africa, "spotting, bombing, strafing, reconnoitering and patroling." The reports add that the planes were "repeatedly subjected to enemy machine gun and rifle fire as they were obliged to fly near enemy positions to identify troops positively before calling for ship's fire." Lieut. Carl R. Malstrom was awarded the Air Medal for valorous action in the early days of the North African campaign. Catapulted from a cruiser in the early hours of the first day of the landing operations, he bombed an airport and spotted enemy forces, reporting their position to the cruiser. Attacked by two fighter planes, the SO pilot ducked into a cloud bank and made his way to safety without being sighted again.

On the second day of the invasion, Malstrom sighted an enemy tank force of considerable strength which was making it tough for advancing American infantrymen. He directed effective cruiser fire on the tank column and also attacked it himself.

On the third day Malstrom earned the Air Medal. A U.S. destroyer was creeping up a river and came under fire from an enemy shore battery 4,000 yards away. The shells were falling within 50 feet of the vessel.

"I knew I had to do something and do it quick," he stated in his report.

Dropping depth bombs, armed with instantaneous fuses, he silenced both guns, exploded an ammunition dump and fired a large building. Landing forces from the destroyer then easily captured their objective, a nearby airport.

Because they have to be tough enough to withstand heavy pounding when landing in rough seas, scout-observation planes are slow and lack maneuverability. To permit this extra stressing and to give them the fuel capacity needed for long-range scouting, weight has to be saved on armor and guns. They are easy prey for swift, hard-hitting modern fighters. A new plane has been designed that promises to be the answer to the SO pilot's dream, but the accomplishments recorded here were performed in what the flyers refer to fondly as the old SOC (Scout Observation plane built by Curtiss). That these planes have accomplished so much in spite of their serious handicaps must be credited in large measure to the training, skill and courage of their crews.

The dangerous missions imposed on SO planes inevitably have caused losses. One of the SO pioneers, Lieut. R. D. Stevenson of Stockbridge, Mass., who was an instructor in the first amphibious-warfare school for observation pilots, was shot down and killed when attacked by two Messerschmitts over Sicily. Lieutenant Coughlin was one of his students. The losses, however, have been far less than might have been expected in view of the manifold hazards.

Once the North African invasion was over, the Navy warships and their SO planes went back to routine convoy duties, maintaining the lines necessary to supply our growing Army and fit it for the important operations to come. In a short time preparations were underway for the assault on Sicily and the SO pilots went back to school to study spotting on the mountainous terrain they would be sure to have to deal with there.

They performed miracles of work in the ensuing operations. Though their planes had been designed primarily for scouting, observing and spotting the fire of warships, to which had been added submarine detection and attack, their versatility, and the skill and courage of the pilots and radiomen-gunners permitted them to carry on a far wider range of activity.

After the initial landing in Sicily, during which Naval gunfire was credited with the destruction of 30 German tanks, the ships went up the coast, blasting the enemy ahead of the Army. Ahead of the Naval vessels went the SO planes, spotting and directing fire. The first place bombarded was Port Empodocle. Lieut. John Mishanec, senior aviator aboard the U.S.S. *Philadelphia*, was directing the ship's fire when an antiaircraft battery opened up on him. Mishanec immediately changed his point of aim to this battery, ordering a 15-gun salvo instead of the usual three guns. The first salvo landed in the business district and completely demolished a block of buildings. Soon the next block of structures also was shattered. The entire German force in the buildings was demoralized by the projectiles from the *Philadelphia's* guns, and another salvo or two finished off the antiaircraft battery.

In every invasion where sea and land forces operated jointly, scout-observation planes performed just such yeoman service—directing the fire of Naval vessels, ferreting out gun positions, strafing enemy trucks and jeeps, dropping leaflets, carrying messages, and doing a thousand and one other vital tasks so essential in an operation of this enormous size and complexity.

At Salerno, Army *Mustangs* were used as spotting planes instead of SOC's. These were so successful that Navy guns were given credit for breaking up two enemy counter-attacks, saving the American doughboys on the beach from destruction or capture.

But the accomplishments of the SO planes are not confined to invasion operations alone. There are many tales of dramatic rescues at sea performed by these pilots. On one occasion a dispatch was picked out of the air stating that an Army bomber had been forced down in the South Pacific. Two search planes were sent out at dawn, piloted by Lieut. (jg) Don G. Douglas, Jr., and Ens. Kirk H. Somerville. Douglas figured the drift of the life rafts and his estimate was so accurate that the planes quickly located the survivors although they had drifted 45 miles from the place where the bomber went down. Two more SO pilots, Lieut. Thomas W. Kerker and Lieut. (jg) Colon W. Alford, took off after receiving a radio report on the position of the Army flyers from Douglas. They landed and picked up two of the seven survivors, then radioed for a *Catalina* which rescued the remaining men, one of whom was injured so severely that he could not be removed from the raft without the aid of a stretcher.

Scout observation pilots have a proud record of achievement. Some pilots may believe that planes on cruisers and battleships are a thing of the past, but not the SO flyers. Given the proper aircraft, they'll challenge their removal from any ship afloat. END

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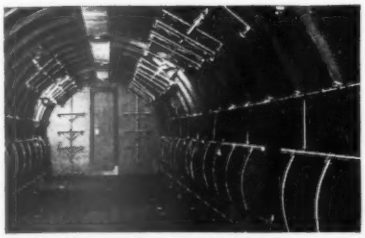

Evans four-man seats folded back out of the way (Army Air Forces Photo)

Seats with safety belts ready for occupancy (Army Air Forces Photo)

Seats rolled and strapped for unoccupied flight (Army Air Forces Photo)

Evans Pulljacks for mooring heavy vehicles

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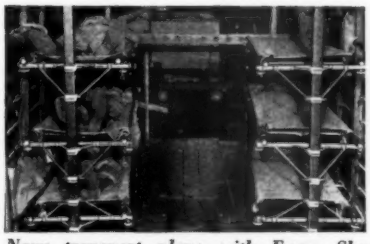
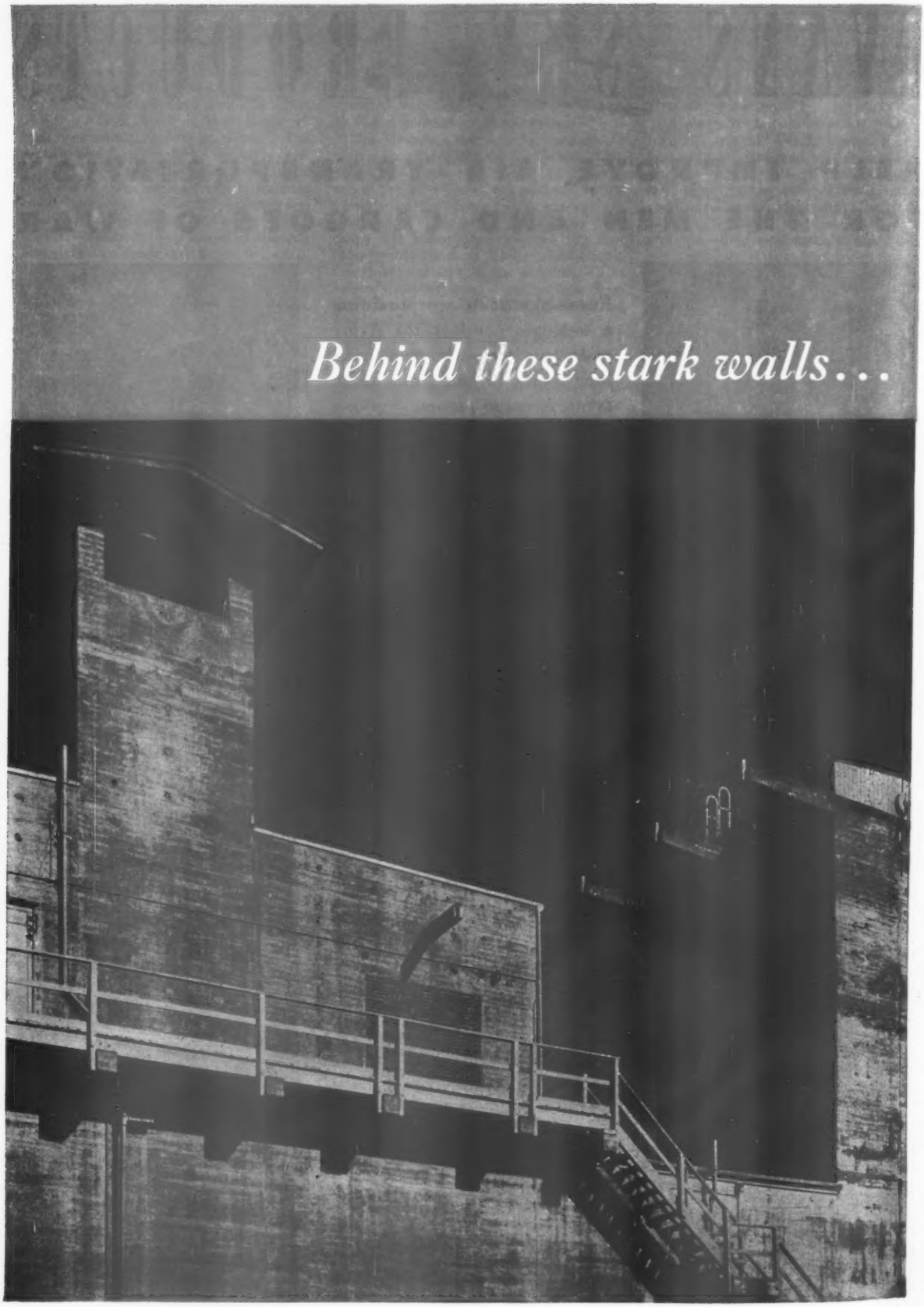


Navy transport plane with Evans Sky Litter Supports (Rohr Aircraft Photo)

Skyloader metal tie-down rods and hardwood beams (Navy Photo)

Skyloader rope hooks and tighteners (Army Air Forces Photo)

Sky Floor section with flush Tie Rings


Behind these stark walls...

Even against the weird landscape of a modern refinery, it is an architectural oddity, a windowless dwarf of a building, a runt in comparison with its towering neighbor the "Cat Cracker."
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to its 50,000 cubic feet per minute exhaust fan its equipment is the last word.
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It is the first full-scale engine testing cell in the petroleum industry. It will enable us to set up the first uniform testing method to get fuel ratings and full-scale data.
And it will be bound to increase the contributions we make to the science of aviation fuels.

VPB—Search

(*Continued on page 113*)

in 1928, Sears lives at Brierly, Mass.; is married and has three children. Like Lieutenant Commander Blackburn, skipper of "Fighting 17" at Bougainville, Commander Sears gets the most out of his squadron. He maintains discipline right up to the hilt when it is needed; none when it isn't.

Squadron 104 is known for its personality, courage, and exceptional record of performance. The squadron has something of a picnic every time it goes out. Informality is the keynote. Both enlisted men and officers enjoy themselves hugely. Flying along near Nauru it wouldn't be at all out of order for one of the gunners to call out:

"Sir, there's a very nice looking tanker about to put into the harbor yonder. What is your pleasure?"

Back comes the answer from Sears:

"My pleasure is to knock hell out of it. Let's go!"

Upon that note the *Liberator* temporarily abandons the search and is off to beat up the tanker or anything else in sight. The big planes often go out of their way to find trouble and the commanding officers are hard-pressed to decide whether a search plane should do a little bombing and extra-curricular work now and then. The results turned in are so noteworthy they can hardly afford to say no.

Not long ago Sears decided that some of his squadron ought to be decorated. After trying vainly to sort out the favored few, he came to the conclusion that all should be decorated. So he urged all pilots to write out a citation for their crews and proceeded to write one for his own plane, excepting himself. Sears listed them all, officers and men, and recommended that they be given the Distinguished Flying Cross. To implement his argument, Commander Sears listed the following impressive record of achievements of his one *Liberator*, most of them far afield from the prescribed routine of a Navy search plane:

August 26, 1943—In the lead plane of a successful eight-plane strike against a destroyer task force evacuating personnel from Rekata Bay, Santa Isabel Island, attacking this force at sunset 90 miles off Buka Passage Scored one direct hit and several near misses on a ship of the 2,300-ton Toratsuki class, leaving the vessel damaged, trailing oil and proceeding at reduced speed.

September 8, 1943—While on a routine search mission, intercepted, engaged and shot down a Mitsubishi MK 36 twin-engined bomber, at a distance of 700 miles from base.

September 26, 1943—While on a routine search mission, located, bombed, strafed and sank an enemy AK-AO (troop, cargo and oiler) of 1,500 to 2,000 tons, 170 miles northwest of Nauru. An explosion from the burning vessel damaged the plane but the flight returned safely to base.

October 7, 1943—While on a routine search mission, located and reported an enemy convoy consisting of three large AK and 3DD's 70 miles north northwest of Kavieng. The force was strafed and bombed from medium altitude despite intense AA fire and interception by six enemy aircraft, three of which were damaged. Although forced to proceed at reduced speed because of AA hits, the flight returned to base 700 miles distant.

October 19, 1943—While on a routine search mission, located and attacked an enemy surface submarine by strafing, causing one crew member to leap into the water, and bombing from low altitude, straddling the vessel with five bombs, one alongside the conning tower. The submarine crash-dived and when last seen was having difficulty to maintain diving trim. The action took place 40 miles south of Kusai Island in the Caroline group, 875 miles from base.

November 4, 1943—While on a special search mission, located 170 miles north of Kavieng, reported, strafed and bombed from masthead height a convoy of two AO's of the 10,500-ton *Nissyo Maru* class accompanied by two Shigure class DD's, scoring one hit on an AO, leaving it stopped and trailing oil, and two direct hits into the engine room space of the second, leaving it halted and burning. The attack was accomplished in the face of intense AA fire from all four ships, 800 miles from base. The flight returned safely despite a number of hits from automatic weapons.

September 2, 1943 and October 26, 1943—in the lead plane on successful strikes against enemy installations at Kahili airfield in conjunction with Army heavy bombers, secured many bomb hits in the target area, despite heavy-caliber AA opposition which caused minor damage to planes in the formation.

November 11, 1943—While on a routine search mission past Nauru Island, the flight was intercepted by five Jap aircraft. In the engagement which followed, two of the attacking planes dropped out smoking. A running fight with the remaining three continued for 15 minutes, and was completed with no damage to our own plane.

November 28, 1943—While on a special anti-submarine patrol near Green Islands, located and sank one enemy barge.

December 2, 1943—While on a routine search mission, conducted a special reconnaissance of Kavieng Harbor and reported a missing convoy of 13 vessels aggregating 64,000 tons. This reconnaissance was conducted in spite of strong fighter and AA protection known to exist at that enemy stronghold. Distance—approximately 750 miles from home base.

December 8, 1943—While on routine search mission 740 miles from home base, made contact with a flotilla of six enemy auxiliary vessels 200 miles northeast of Kavieng. The convoy was reported and attacked from masthead height despite moderately intense AA fire which shot out an engine. Four of the vessels were sunk, including an AM and a YP, one was possibly sunk while returning to Truk, and the sixth was damaged, causing it to trail oil.

That, in part, is Sears' list. The last named attack brought this special dispatch from ComSouPac:

"For this one-plane blitz, well done—Admiral Halsey." END

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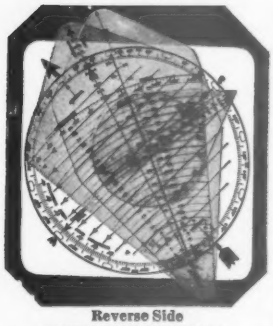

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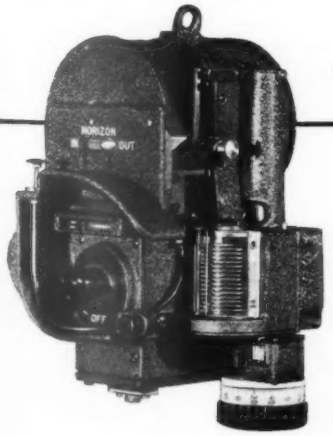

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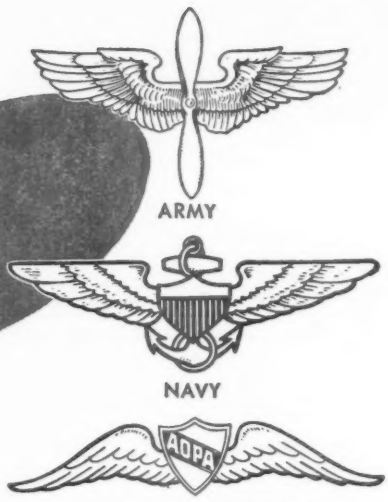

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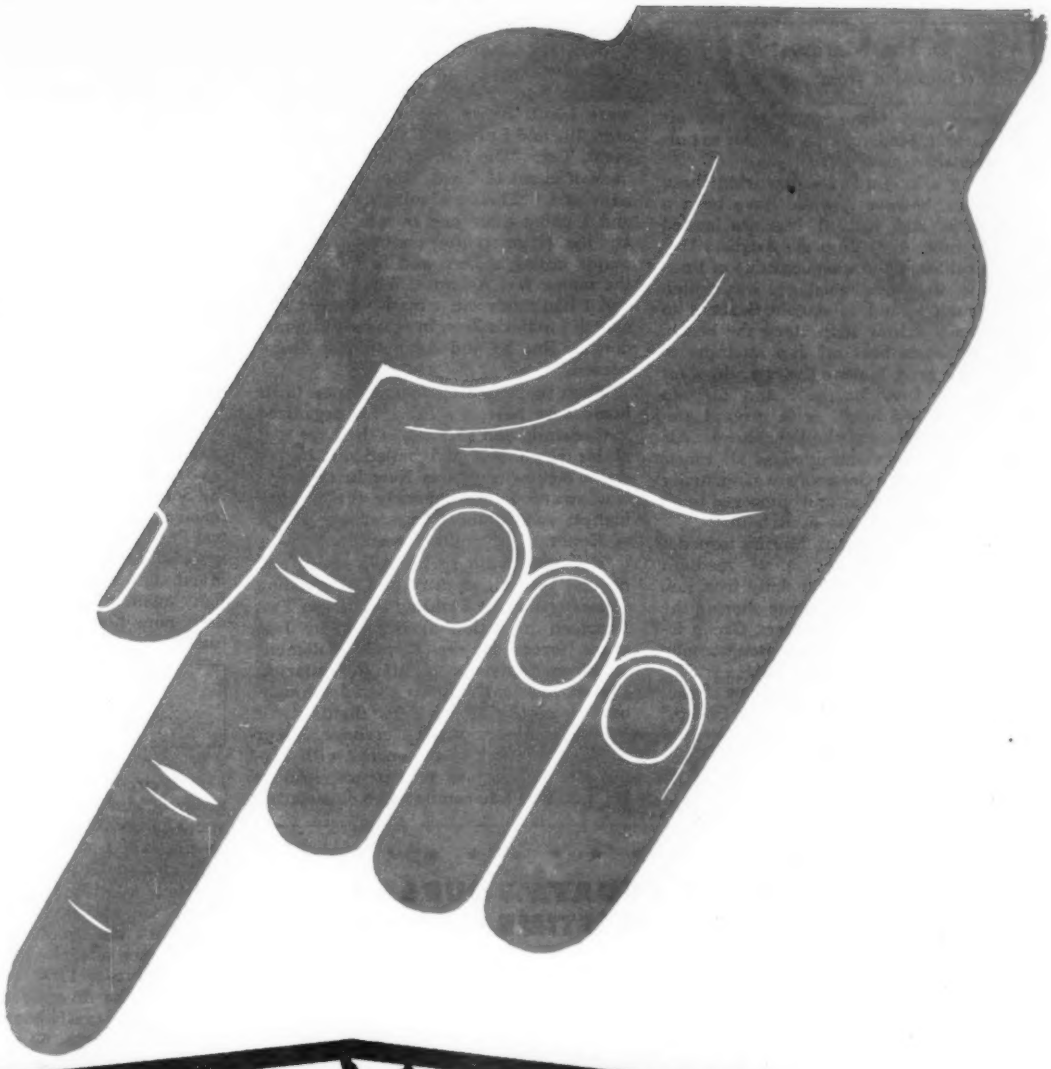

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The Marines

(*Continued from page* 108)

by fewer and fewer Japanese aircraft were encountered, making it easier to pulverize enemy ground positions.

Making a landing and capturing these airdromes, however, would have been a costly task and, instead, Marines landed on November 1, at Empress Augusta Bay on the center of the west coastline of Bougainville. Japanese resistance was beaten far enough inland to enable Seabees to construct a fighter strip along the beach. While Marines beat off Jap attempts to retake the area, Marine flyers again went to work. Dive bombers and torpedo bombers joined hands with ground elements in broadening the beachhead. Air superiority was maintained at all times. The battle for the Solomons was virtually over and American aircraft pincered in on the powerful Jap base at Rabaul.

In pulverizing Rabaul, Marine torpedo-bombers, fighters and new medium *Mitchell* bombers took off daily from the Bougainville area. In order to shorten the distance to Rabaul for fighters, Green Island, a small island between Bougainville and New Britain, was occupied.

Among the Marine squadrons flying from Bougainville was "The Black Sheep," led into combat by the late Maj. Gregory "Pappy" Boyington. It was over Rabaul that Major Boyington shot down his 26th Jap plane, to tie the record of Maj. Joe Foss, and then disappeared. First Lieut. George M. Ashmun of Far Hills, N. J., the major's wingman, was also lost. The last two men to see the Marine ace alive were Lieut. Bruce J. Matheson, of Chicago, Ill., and Rufus M. Chatham, of Beaumont, Tex. "The four of us dived into a pack of about 12 Zeros," Lieutenant Chatham said. "Then we split up, Matheson and I going after one bunch, the major and his wingman after another. I saw the major tailing a Zero and firing. Behind the major was Ashmun. When Matheson and I had made our runs we turned and saw the major's Zero in flames and going down. But he and Ashmun had disappeared."

When the squadron had returned to its home base here, a search was organized immediately and sent out in the hope that Major Boyington had bailed out in the water somewhere near New Britain. He was awarded posthumously the nation's highest award, the Congressional Medal of Honor. The citation reads:

"For extraordinary heroism above and beyond the call of duty as Commanding Officer of Marine Fighting Squadron Two Fourteen in action against enemy Japanese forces in the Central Solomons area from September 12, 1943 to January 3, 1944. Consistently outnumbered throughout successive hazardous flights over heavily defended hostile territory, Major Boyington struck at the enemy with daring and courageous persistence, leading his squadron into combat with devastating results to Japanese shipping, shore installations and aerial forces. Resolute in his efforts to inflict crippling damage on the enemy, Major Boyington led a formation of 24 fighters over Kahili on October 17 and, persistently circling the airdrome where 60 hostile aircraft were grounded, boldly challenged the Japanese to send up planes. Under his brilliant command our fighters shot down 20 enemy craft in the ensuing action without the loss of a single plane. A superb airman and determined fighter against overwhelming odds, Major Boyington personally destroyed 20 of the numerous Japanese planes shot down by his squadron, and by his resourceful leadership developed the combat readiness in his command which was a distinctive factor in the Allied aerial achievements in this vitally strategic area."

Toward the close of the campaign for the Solomons, Marines launched a new offensive against the Japs through the Central Pacific. First the Gilbert Islands were wrested from the enemy and then the Marshalls. Marine aviation continues the fight against the Japs in these islands, daily pounding enemy fortified atolls still unconquered. END

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Crash Boats

(*Continued from page* 129)

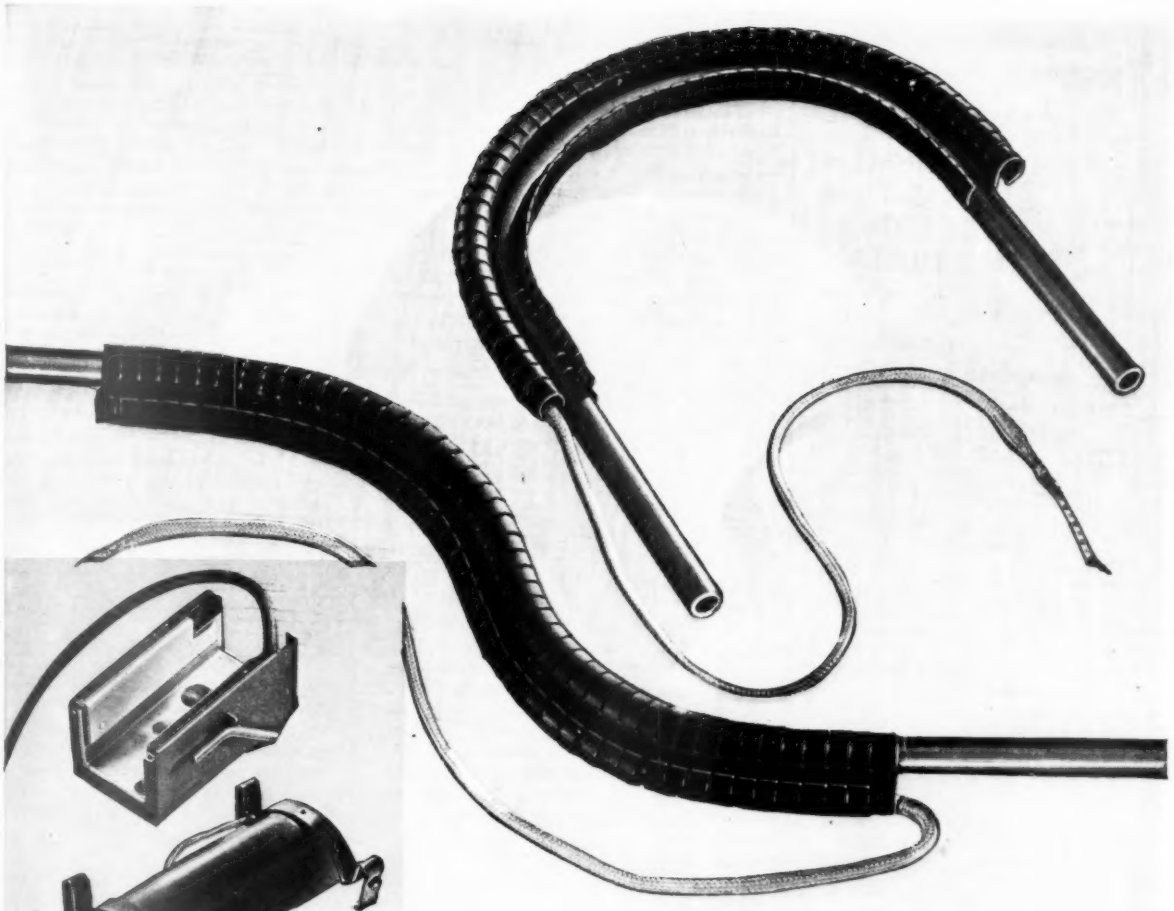
When the *Corsair* is sighted, the pilot is seen circling the plane on a raft, with a group of kinky-haired Melanesian natives standing on shore yelling "Boola," which means practically anything. The crash boat crew pulls alongside the plane, only the tail of which is above the surface. Floats are attached, and after considerable work, the aircraft is brought up. The pilot comes aboard and tells his story—motor failure at 1,000 feet, with a pancake landing. The divers attach the damaged plane to the crash boat and start home.

The crash boats, 63 feet long and powered by two 650-h.p. Hall-Scott engines, are capable of 37 knots. They're rough, very rough. The crew is not allowed forward of the lower bridge or in the crew's quarters when the boat is in motion.

Two crewmen were seriously injured in one of the boats in England. The skipper, unaware of their presence forward below decks, sent the boat ahead at full speed on an emergency run and the unfortunate crewmen were literally beaten to unconsciousness before the trip was completed.

Crash boats carry medical supplies, litters, plasma and all other emergency equipment for saving lives. They also carry a dinghy, two life rafts and towing lines. In case Japs turn up, the boats are armed with twin .50-caliber machine guns in the turrets. Below decks are stored tommy guns, rifles, side arms and knives.

Not all rescues are bloodless. In one instance, a *Catalina* began to "porpoise" and cracked up shortly after take-off. The tail structure broke loose and the crew members were injured badly, one man having both feet amputated as the plane hit the water. When the crash boat reached the scene, the crew member with the severed feet resisted immediate rescue, calmly smoking a cigarette while di-



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recting attention to the others. The crash boat got seven men out of the plane; two others had drowned. Of the seven, six soon returned to duty.

The keynote of crash boat operations is speed. Planes sink quickly—often with badly injured crews. Many times crash boats arrive to find only an oil slick on the surface. But for the most part they are able to effect rescues. Once a *Corsair* pilot, taking off at night, hit a tree top and went into a spin. He bailed out at 500 feet. Either his parachute opened just as he hit the water or, miraculously, he survived a 500-foot fall. At any rate, his back was injured only slightly; the crash boat located him with a searchlight and he was saved.

The crash boat crews, officers and men alike, live, eat and sleep aboard their tiny boats. They play cribbage a good deal and trade the natives out of bows and arrows, spears, shells, boar's teeth, tapa cloth and other novel souvenirs.

Lieutenant Greene's squadron of five boats once cruised from Noumea to Espiritu, a trip of several hundred miles; lost their course in a hurricane and came to rest on an island. Five crewmen went ashore and received directions to their destination. On another occasion, a missionary sent word by native runners that the mission was out of a certain medicine and an epidemic had broken out. Crash boats rushed supplies that saved the day.

The crash boat crews have their lighter moments. One commander wanted to visit a nearby island; so a crash boat took him over. Against the crew's advice, he insisted on being put into a dinghy to row ashore. The crash boat sped away on another mission. Meantime, the wind whipped up a heavy surf and the commander capsized. On the way back, the crash boat crew had trouble locating him but finally spied a fire at one point on the beach and eased up close. The commander, naked as a jay bird, was huddled over the blaze eating a piece of ancient taro. He had been obliged to trade off his clothes to the natives for matches and lunch. END

CV—The Carriers

(*Continued from page 51*)

It also added 60,000 to the number of Japanese troops isolated in the South and Southwest Pacific. Surprise played an important part in this operation but the weakness of the air opposition was believed caused by the previous cutting of the supply lanes from Japan, through which aerial reinforcement could have come.

On the way back from New Guinea the carriers again hit Truk, destroying 126 planes, and then moved over to Ponape where a combined shelling and bombing operation was carried out on May 2. The tremendous power of the new carrier fleet was demonstrated by the pace of its actions in May and early June. The month opened with the blows on Truk and Ponape. A little over two weeks later, a carrier force covered Allied landings on Wakde Island, New Guinea. On May 19 and May 24, enemy installations on both Marcus and Wake islands were smashed. Meanwhile, far to the Southwest, a British-American carrier task force struck the great naval base of Soerabaja, Java, formerly the seat of Dutch power in the East Indies and now Japan's chief base. This was the second joint British-American carrier raid using forces based in the Indian ocean; the first, at Sabang, was in mid-April.

The spectacular raids and battles of recent months—the shattering blow at the Jap fleet near the Philippines, the action at Saipan, the raids against Guam and Rota, and all the rest—point clearly to an accelerating offensive that will carry the Pacific war directly to Japan itself. That our fleet has grown to irresistibly powerful proportions is evident in the magnitude of these recent engagements, which have taken place well within Japan's outer ring of defenses. In the battle fought from June 10 to 23 between the Philippines and the Marianas in connection with the Saipan invasion, more than 750 enemy airplanes, 30 ships, and 13 barges were destroyed. American losses included 151 planes destroyed and one ship damaged. The Japs are in a poor position to stand losses of this kind. They need every ship and plane they can muster, and considerably more, to survive the storm that is gathering.

High point in the fighting for control of the air and sea during the Saipan operation was the Battle of the Eastern Philippines, fought at long range by air on June 19 and 20, with the Japanese and American fleets 300 miles or more apart. This battle will rank with Midway as one of the decisive engagements of the war and was certainly one of the greatest aerial victories in history.

On June 19 the Japanese naval air arm went all out in an attempt to destroy the American fleet supporting Saipan. Their intention apparently was to hit our fleet, refuel and rearm on Guam, and then hit the fleet again on the way back to their carriers.

In that one furious day of fighting more than 400 Japanese planes are known to have been destroyed. Of these 387 were shot out of the air, 369 by the guns of carrier planes, and 18 which slipped through this outer defense by antiaircraft fire. These figures indicate that only five per cent of the Japanese planes which started for our fleet penetrated its airborne defense. We lost 27 planes in that day's fighting and a total of 18 pilots and six air crewmen.

The following afternoon our planes struck at extreme range at the retreating Japanese fleet, catching it just before sunset. Five Japanese ships were sunk, two more probably sunk, two damaged, and 26 Japanese planes shot down. Three of Japan's latest and finest aircraft carriers were among those hit—one sunk, one probably sunk, and the third damaged. A light carrier also was probably sunk, another damaged, and a battleship hit by several bombs.

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In addition to providing the massed air power which led each of these great advances, carrier airplanes dealt staggering blows at enemy air power. In the eight months after September 1, 1943, carrier planes destroyed 1,229 enemy aircraft, of which 673 were shot down in combat and 556 destroyed on the ground. These 1,229 definite kills cost us 164 carrier planes. The figures, of course, do not include the Saipan operations.

American inventive genius was responsible for a device which has greatly increased our carrier striking power. It was the folding airplane wing, which nearly doubled the parking capacity on many of the big flat-tops. Some authorities believe that the escort carrier would be entirely impracticable as a combat type without the folding wing. The primary reason for our increased potency during the later part of 1943 and in 1944, however, is the emergence of the "terrible twins" of the Navy and Marine Corps—the Grumman *Hellcat* fighter, used by carrier squadrons, and the Vought *Corsair*, a land-based fighter. Both are capable of operating either from land or carriers. In 11 months of combat in 1943 the *Corsair* hung up a record of 584 Jap planes shot down or destroyed on the ground, as against its own loss of 108 planes, many of whose pilots were rescued. The *Hellcat* figures for the first eight months of use, already cited, are equally cheering.

In the present war the great engagements have been at long range, and the fleet whose carrier planes could outrange its enemies has had the advantage. To quote Rear Adm. DeWitt C. Ramsey, chief of the Bureau of Aeronautics, "The carrier . . . has completely revolutionized naval strategic thinking and naval tactics. When the Battle of Jutland was fought in the last war, the curtain went down forever on the old-time concept of the fleet engagement."

Ninety-five of our planes failed to return from this strike. While some were shot down, the fact that personnel losses were only 22 pilots and 27 air crewmen indicates that most of the planes lost ran out of fuel in the darkness and were forced down. They were not shot down by enemy planes or ship-based guns. A high percentage of the personnel of planes forced down was recovered.

Enemy plane losses for the two days' fighting were at least 428; a figure which does not include those which ran out of fuel and were forced down because the Guam airfield was made unusable by our bombs and shells, or those which went down with their carriers.

During the fighting in the Marianas, the American public learned for the first time of the existence of Task Force 58, composed of the latest and swiftest carriers, battleships, cruisers, and destroyers in the U. S. fleet. It has been the spearhead of all our attacks since its formation immediately after the Marshalls operation.

Task Force 58 is commanded by Vice-Adm. Marc A. Mitscher. In addition to its capacity of launching more than 1,000 planes from more than one and one-quarter million square feet of seaborne runway, this task force can blast enemy shore installations with more than 850 large-bore rifles, ranging in size up to the largest coastal defense guns. This firepower alone is the equal of 70 standard Army field artillery units.

Historians of the Pacific war may well point to two periods, not now widely regarded as important, as major turning points. One is November, 1942, when the Japanese definitely gave up the attempt to expand their holdings and went on the defensive. The other date is September 1, 1943, when the first raid by an all-new carrier task force was carried out. Since that time, America has been on the offensive in the Pacific. In the following nine months, Allied forces occupied or neutralized all the southern and southwestern Pacific areas to the western tip of New Guinea; they took the outer defenses of the Central Pacific in the Gilberts and Marshalls; and they virtually neutralized Rabaul, Truk, and Palau.

How long the carrier-borne plane will remain the chief striking weapon of the Navy cannot be predicted. The carrier may prove a temporary makeshift, to be discarded when the range of land-based planes is extended, although the long-range land plane will, of course, always be under the handicap of having to carry an extra gasoline load.

The "super-carrier" may prove to be the future queen of the seas—a ship which can carry fighters large enough and powerful enough to defend itself (with the aid of gunfire) against any land-based aerial giants that may be developed. One thing is certain: the carrier of the future will be part of a great team consisting of subsurface and surface units, ground forces, and ship- and shore-based air power. Whatever the carrier's future, she has already repaid the confidence the Navy and the public had in her. In the words of Adm. Aubrey Wray Fitch, Deputy Chief of Naval Operations for Air:

"Though to some she is only a makeshift, half ship and half airfield, a bridge between yesterday and tomorrow, we would be in a sorry plight without her today. Undisputed queen of the Pacific, she is not too regal to work with other land, sea, and air forces. Today she hunts with a sea-going task force, flying searches, and anti-sub patrols, sinking enemy ships which are beyond the range of the fleet's biggest guns but not the carrier's planes. Tomorrow she becomes the flying island that arrives at the strategic moment when Army and Marine ground forces must have air support. She has grown great by being the servant of all."

(*Continued on page* 303)

Black Cats

(*Continued from page* 115)

borrowed from a wrecked tank, but it wouldn't fit. With the greater load the PBY-5A groaned, yet rose and flew. Currently, the Japs have great respect for those nocturnal marauders. Jap night fighters keep a respectful distance. If it's a choice of jumping a Black Cat or a PT boat, the Nip will strafe the PT every time.

What the Black Cats are doing to win the war cannot be appreciated until the strategy of the Solomons campaign is fully understood. That is one thing the public should be told. The average American picks up his morning paper and reads about another Jap barge sunk off the shore of some faraway atoll in the South Pacific. He may even see a picture of the beached ship, burned and ruined, lying half in the water and half out under the overhanging shade of the cocoanut palms. It's nice to know, but it isn't very exciting. He turns the page to read about big bombers wiping out whole cities and the little barge seems trivial.

Actually, the little barge which didn't get through with the groceries represents imprisonment for the Japs on the island it was headed for. We know what it costs in lives and explosives to take a Tarawa or a Kwajalein, but we do not know enough about how the Japs have been starved and squeezed out of the whole long chain of Solomon Islands.

The first move of an advance in the South Pacific is to knock out the enemy air opposition. Jap planes on nearby fields are kept on the ground by ceaseless bombing of their strips. Then in go the LST's with the Marine raiders to bite off a tiny chunk of the island where we want to base our planes for further moves. And the Army comes up with guns and tanks and holds the lines. Seabees quickly lay the strips; our planes come in; and offensive air operations are begun. What if there are 10,000 or 20,000 beleaguered Japs within five miles of the airfields? If they show their noses the dive bombers will work on them. Every time the Japs drag up an antiaircraft gun, a Navy or Marine dive bomber is detailed to knock it out. If the Jap gun remains, it will need ammunition. That is where the barge running and the Black Cats come in.

Throughout the Solomons campaign there have been three squadrons of Black Cats. VP-12 was the first. It came to Guadalcanal in December of 1942, and was replaced by VP-54. VP-54, in turn, was relieved by VP-81. They keep up a constant rotation to avoid combat fatigue. The squadrons are not very large and not more than three or four Cats go out each night. But the results are anything but negligible. VP-12 flew more than 300 combat missions. VP-54 dropped an amazing number of bombs on Munda and Vila as their contribution to the softening-up process of those airfields. The squadron members strafed barges galore, beaching a great number of them. As a sideline, they rescued 52 men, 27 of them pilots. The returns on VP-81 are not all in, but the record they have made under their

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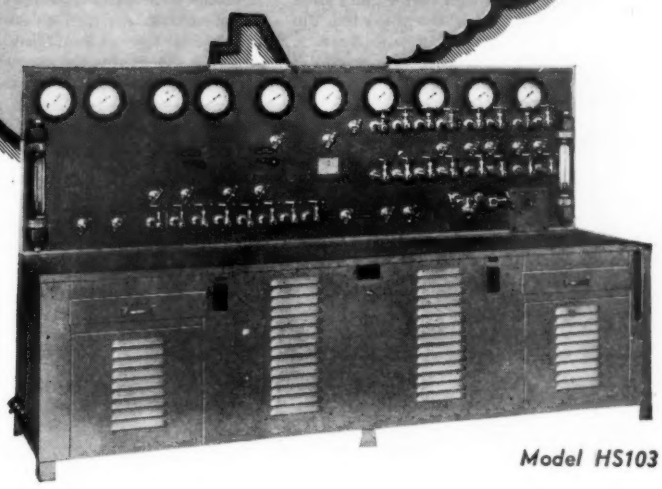

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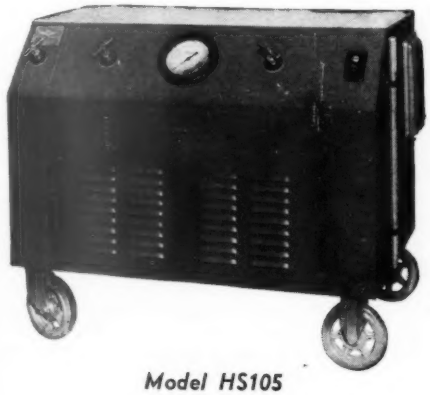

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skipper, Lieut. Comdr. E. P. Rankin, is truly impressive.

Some of the missions are varied and sometimes they get pretty lively. On Christmas Eve, 1942, two Black Cats of VP-12, each loaded with two torpedoes, set out to attack shipping in the Buin-Kahili area. Lieut. Norman E. Pederson and Lieut. Ronald F. Stultz were pilot and co-pilot of one, Lieut. William L. Pack was flying the other alone. Near Fauro Island, just opposite the Shortlands, Lieutenant Pederson decided to make a practice run on a reef. While making the run he picked up a surfaced enemy sub near at hand. Since the sub, once spotted, did not dive, the pilot made a wide turn to hit it abeam. Shultz dropped a torpedo at 600 yards set to arm in 450 yards and with a depth setting of 11 feet. Rings around the sub indicated a direct hit, though no explosion was seen. Feeling that they had paid their respects to the sub, the crew then continued to the Shortlands. A Jap destroyer was discovered at anchor in Shortland harbor. The Cat made two dry runs before getting in one that suited. On the third, after the plane's torpedo had been dropped, the ship opened up with antiaircraft. The plane banked sharply to escape it. The result of this attack was impossible to obtain, but the crew felt reasonably hopeful that the torpedo connected. Meanwhile Lieutenant Pack had flown formation with Lieutenant Pederson about halfway to Bougainville and then lost him. Searching the waters below Buin and Kahili, he located four destroyers anchored off Fauro Island, three of them together and one off half a mile by itself. Pack dived on the straggler and dropped a well-placed torpedo, then got out in a hurry. Destroyers are bad medicine for slow-flying patrol planes. However, this torpedo was also believed to have got in, winding up a very successful Christmas Eve for the two-plane Black Cat party.

A month later, Lieut. Clyde W. Curley, also of VP-12, took off at midnight to help some PT boats work on the Tokyo Express. His job was chiefly to point out the route. Fifteen miles off Cape Esperance he saw three destroyers and, simultaneously, a light cruiser. For an hour Curley trailed the cruiser, giving continual reports to the four PT's that were detailed to attack it. Once he came down to 350 feet and again to 500, dropping smoke lights ahead of the cruiser to direct the PT's. They joined the battle, and the Cat saw tracers from both the PT's and the cruiser. After working in close enough to deliver their Sunday punch the PT's withdrew, without being able to check the damage. Twice during the melee the Cat narrowly escaped destruction, once getting caught squarely in the ship's searchlights, making a perfect target. One of the most interesting parts of this mission occurred when Curley was returning to his base, which was then Henderson Field, Guadalcanal. Another plane seemed to be following him in, he reported to the field. The plane's lights were directly on him. He decided that if the condition existed when he sighted the field, he would open fire. While he circled for a landing, however, the plane shot by without any hostile action. It turned out to be a Navy plane whose pilot said that he had not even seen the Cat, thereby proving the effectiveness of the black paint, the sealed-in navigating compartment, and the like. His statement also made clear why the Black Cats prowl on their own.

The pilots of VP-54 keep equally busy. The night of July 2 Lieutenant Commander Schoonweiss and Lieutenant Erhard rescued eight *Dauntless* pilots and one *Corsair* pilot at Rennell Island after the strike of June 30. On the same night Lieutenant Anderson, feeling in an indestructible humor, took on a heavy cruiser, two light cruisers and four destroyers. He dropped some big ones on the heavy cruiser and more on one of the destroyers. After his bomb load was expended, he tracked the Japs until daylight.

Again, on July 19, Lieutenant Johnson made a night contact with an enemy task force of a heavy cruiser, two light cruisers, five destroyers, and three transports ten miles off Fauro Island. He tracked them into Vella Gulf and made a glide bombing run on the three transports which were in close column formation. All of his bombs were dropped in a stick. Result: All ships hit and two left smoking. Intense antiaircraft fire was encountered which resulted in severe damage to the Cat. *Avengers* then went out and scored repeatedly.

A Black Cat can be hit. Lieut. (j.g.) Samuel Lefcourt Lanier, of VP-81, dis-

(*Continued on page* 304)

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WHAT IS A CARRIER?

(*Continued from page* 300)

AN aircraft carrier is a complex mechanism. It is, to begin with, a seagoing hangar and landing field. It compensates for its comparatively brief length by using its speed to help launch its planes and arresting cables to help land them. Even so, the landing field on the smallest carrier is more than one and one-half times the length of a football field; on carriers now building it is more than three times as long.

A carrier is the wartime residence of 1,000 to 3,000 men and contains complete facilities for taking care of their food, clothing, cleanliness, and—to a limited extent—their recreation.

The giant power plant of a fleet carrier is capable of supplying the electric power for a fair-sized city. The old U.S.S. *Lexington* once supplied electric power to the city of Tacoma, Wash., for a 30-day period during an emergency caused by a drought.

The trend now is for the carrier to have heavy gun-power of its own in addition to the wallop packed by its planes; and to have increasing "toughness" of construction. It can withstand a heavier enemy attack than is popularly believed.

There are several carrier types and sizes, some of them only historically important. The United States entered the war with seven larger carriers commissioned and ready for action. These were the *Saratoga, Lexington, Ranger, Yorktown, Enterprise, Wasp* and *Hornet,* to list them in the order of their age.

The *Saratoga* and *Lexington* were 33,000-ton twin giants, the largest ships of the U.S. fleet for many years. They were converted from battle-cruiser hulls at an early stage of construction and commissioned in 1927. The 14,500-ton *Ranger* was the midget of the "big carrier" fleet. Commissioned in 1934, she was the first of our carriers to be designed and built as such from the beginning.

The *Yorktown* and *Enterprise* were sister ships commissioned in 1937 and 1938, respectively. The *Wasp,* commissioned in 1940, and the *Hornet* commissioned in 1941, completed the "big carrier" fleet. The *Hornet* had been commissioned only six weeks before Pearl Harbor (October 21, 1941) and was still on her shakedown cruise on the memorable morning of December 7. Thus, four of the seven first-line carriers which finally stemmed the Jap attack were commissioned in the last five years before Pearl Harbor. We were late in our building program but fortunately not too late—and there were 11 more first line carriers under construction or contracted for.

In addition to the seven carriers available on Pearl Harbor day there was one converted merchantman, the *Long Island,* which was then classified as an aircraft escort. Later on, the work of these "baby flat tops" won them the designation of combat ships—escort carriers, or CVE's.

Four of the big carriers available at the time of Pearl Harbor—the *Lexington, Hornet, Wasp,* and *Yorktown* were lost in action during the next year.

The Navy's first-line carriers today include these three survivors—the *Saratoga,* a 33,000-ton converted battle cruiser; the *Enterprise,* sister ship of the lost *Yorktown;* and the 14,000-ton *Ranger.* In addition, there are a number of new ships of the 33,000-ton *Essex* class, of which seven had been reported as completed by January 1, 1944. These seven are the *Essex, Intrepid* and *Bunker Hill,* plus four carriers named after those lost, the *Lexington, Yorktown, Wasp* and *Hornet.*

The 1944 construction program called for many additional carriers of the *Essex* class, with improvements being made in accordance with battle experience. Also well advanced in construction in '44 were two new super-carriers of 45,000 tons—giants designed to combine many of the characteristics of a battleship with those of a seagoing airport. It is expected that these, called CVB's, will have greatly increased armor protection and firepower; will be elaborately protected by compartmentation against torpedo attack; will have more speed than any carrier now in use; and may be capable of launching and taking aboard twin-engined medium planes.

Highly important supplements to the big carrier fleet were the 10,000-ton converted cruisers which have been officially designated as the *Princeton* class. These ships, though comparatively small, have the speed and power to make them first-line carriers in every sense and have been in on every major fleet action of the past year.

Of the escort carriers, or CVE's, three standard types have developed. The usefulness of the first decked-over freighters, the *Long Island* and *Charger,* was such that other conversions followed rapidly. Standard types are now the converted merchantman or *Bogue* (*Copahee*) class, the converted tanker or *Sangamon* class, and the mass-production *Casablanca* class, which has the advantage of being designed originally as a carrier. While all the CVE's suffer from the disadvantages of slow speed (15 to 20 knots) and a short flight deck of around 475 feet, they have been extremely valuable in a "triple threat" capacity. All can patrol great stretches of ocean as convoy escorts, ferry large numbers of planes, or perform regular carrier functions in amphibious operations. The CVE's in the ferry service carried more than 2,500 planes to the fighting fronts in the first year of war and on occasion launched them directly into combat at the end of the ferry run. Operating as carriers, the CVE's have "combined" squadrons of 24 or more planes, while the big fleet carriers normally operate upwards of 80.

There were 65 carriers in active service with the fleet in May, 1944, according to a statement of Artemus L. Gates, Assistant Secretary of the Navy for Air. These 65 had a combined flight deck area equal to that of 120 football fields, or to an airstrip seven miles long, Mr. Gates said.

In the same statement, it was revealed that Navy airplanes of all types "will soon total some 37,700." In addition to the carriers in service with the U.S. fleet, the names of 38 escort carriers that have been transferred to the British fleet under Lend-Lease have been released. Thus more than 100 American-built carriers were in service with the Allied navies as of the spring of 1944. Security prevents disclosing the total number as of today, but it is a figure that would bring small comfort to the Japanese.

☆ ☆ ☆

CARRIER TEAMWORK

SUCCESSFUL carrier operation means split-second timing and fine teamwork, requiring close co-operation between the ship's personnel and members of the air group. Public acclaim goes largely to the airmen but the ship's crew is satisfied with the knowledge that their hard, careful, and frequently dangerous work makes the air victories possible.

Many carriers tell the crew exactly what the mission is once the task force is well away from land. Play by play accounts of the fighting are broadcast over the "bullhorn," or loudspeaker system. When the pilots return they are frequently asked to describe their experience, via loudspeaker, to the entire crew. Such measures are good morale builders—they give meaning to the talk of every man on the ship.

Each carrier action brings its new stories of skill and heroism. These are told and retold in the mess halls, the ward room, and the ready rooms until they become part of the lore of the ship and of the Navy.

To choose the "best" of these stories seems rather arbitrary, but certain ones grow to legendary proportions. Carrier and plane crews are fond of talking about the following incidents of recent months:

* * *

THE squadron using the emblem "Pistol Packin' Airedale" was assigned to keep the Japs from flying reinforcements out of the northern Marshalls to Tarawa. The first day on this patrol the squadron sighted 20 Japanese planes. In slightly less than 15 minutes 17 of the Japs were in the water and the other three were so badly shot up that their return home was considered unlikely. The Airedales lost no pilots and only one plane. Lieut. (jg) E. R. Hanks, who had never been in individual combat before, got off to a tolerably good start by knocking out five Japs in five minutes [see color section in this issue.—Ed.]. On the next day planes of this same squadron, outnumbered two to one, got 10 more Zeros and two bombers.

* * *

AN EVEN more impressive score for a brief period of fighting was rolled up by eight fighter planes led by Lieut. Comdr. E. D. Outlaw over Truk on April 29. They took on two enemy formations totalling approximately 40 planes and shot down 21 at no loss. Lieutenant Commander Outlaw got five and one probable.

* * *

ENS. MAX KERN, USNR, had been on two strikes when his torpedo squadron participated in the great March raid on Palau. He was a little apologetic in reporting the results of his low-level bombing run on a medium cargo ship. Be-

(*Continued on page* 324)

(*Continued from page 302*)

covered this fact during a joint air and surface attack on Jap shipping near Oema Atoll, the night of February 16. Lieutenant Lanier had a great many hours under his belt at the time, as befitted a patrol plane commander.

The crew consisted of 10—three pilots, a navigator, a radioman, and an ordnanceman. The action did not start immediately. The Cat first joined the PT boats at Choiseul Bay around 10 o'clock and dropped flares for them at Emerald entrance. The boats asked the Cat to search along the southeast coast of Bougainville and to meet them again at Oema Atoll in an hour's time. Since the search yielded nothing, the Cat rejoined the PT's, picking up an indication which was thought to be Oema reef. As it homed on this indication, a wake was observed. Eyes accustomed to the dark strained to see more. It wasn't any reef; it was a ship of about 1,200 tons surrounded by a cluster of 80-foot craft, and all heading south. The central craft was a gunboat of a new type, later reported by the PT's to be carrying 7.7, 20-, and 37-mm. guns.

As soon as this group was sighted, both the PT's and the base were informed of the contact and the Black Cat went to work on its own. The first run was easy. The Jap will invariably hold his fire until he is positive he has been discovered. Jap ships, incidentally, are always very careful about shooting down their own night fighters. On the first low strafing attack the big gunboat was clearly visible—about 50 feet wide with one stack located amidships. After the second run, the cat held off a few minutes until the PT's came up.

The PT's and the Black Cat complemented each other perfectly. As soon as the torpedo boats arrived, they informed the Cat that one of the smaller Jap boats was already smoking, plainly in trouble. A co-ordinated attack was then planned. Flares went down from the plane, lighting up the target for the torpedo boats. Then the planes and the PT closed in together. The three torpedo boats closed to 200 yards, firing every available gun at two of the barges. At the same time the Cat strafed from one end of the Jap group to the other. Shortly after this the PT boats reported that two more barges were smoking.

The Cat then requested the PT's to hold off while it tried a bombing attack. In hot spots like this the *Catalina* usually climbs upstairs and starts diving across, pulling out at moderate altitude over the target. On this particular attack Lanier wanted to make sure, so he went down much, much lower before releasing two bombs and six frags. These were reported by the PT's as effective near-misses. Encouraged, the PBY tried a fourth pass, strafing and tossing out more fragmentation bombs.

This time the Cat itself was hit. The oil pressure on the port engine dropped to zero and all the instruments on the left side of the pilot's cockpit quit functioning. The PT's likewise were in distress, two with an engine out apiece, and all three with holes in the hull. Lanier's plane was having real trouble staying up on one engine. It had been hit at 900 feet, and immediately he had to put full power on the good engine. A PBY usually cruises at 115 m.p.h. and cannot maintain altitude at less than 98 m.p.h. with a heavy load. Lanier was doing only 95 and losing altitude rapidly. He dropped the two remaining bombs and then the waist and tunnel guns and the rest of the fragmentation bombs and flares. But it wasn't enough. So he took a chance and dumped 450 gallons of gasoline. Everything that could lighten the plane had to go—even a cup of coffee cream.

Finally, while struggling along at 800 feet, the base at Treasury Island was raised. Searchlights shot up and Lanier brought his plane down at night on a runway where he had never landed before. When the damage was determined, several holes from explosive shrapnel were found, the oil tank was split, the tab control cable was shot away and the main spar in one wing was hit. Yet not one man in the plane received a bruise. There was no way to tell accurately what happened to the barges, but it was reasonably certain that they were put out of commission.

As these accounts indicate, the bulk of Black Cat work against enemy barges is carried out in close co-operation with the little PT boats. Co-ordination between air and surface craft, even in a broad daylight attack, requires the utmost in staff work and co-operation of the personnel involved. To do this at night is doubly difficult. Plane crews and PT boat crews become well acquainted with each other by radio, yet they seldom, if ever, actually see each other.

An effort to remedy this situation slightly was made by some of the officers of VP-81. They invited Lieut. (jg) Tom Leydon, the intelligence officer for the PT boat group to come up for a visit. The visit was to include "a ride about the circuit in a Black Cat." Lieut. W. K. Love, the squadron intelligence officer, was officially the host. They had dinner at the mess hall.

The mission that night turned out to be pretty much of a three-ringed circus. The PT intelligence officer climbed into the plane piloted by Lieut. C. N. Vogt. Just as the night flyers made contact with the PT boat support they picked up three large Jap barges heading toward Oema Island. The Cats made a pass over the barges, dropping flares. Then, at the request of the PT boat, Lieutenant Vogt dropped his four bombs. He was unable to observe the results, but the PT boats reported direct hits on one barge. Immediately the Cat turned and made a strafing run on the wounded barge. Enemy searchlights caught the plane but the antiaircraft fire was ineffective. The only trouble from the barges was the blinding glare of the Jap tracers. In the meantime, shore batteries from Oema had opened fire, and at the same time a bogey (Navy code for unidentified plane) was picked up.

The PT boats suggested that the plane proceed to Tauro Bay and operate in that area for the rest of the night. They would follow along, they added. By the time the PT's closed to within 100 yards, the Japs sent one barge on the beach and the other high-tailing seaward.

Later on that night, Vogt's plane encountered an additional five barges heading toward Ratan Island, which he strafed with good results.

Long before dawn the surface boat officer got another chance to see from the air the close tie-up between the Cats and the PT's. Jap barges headed for the river that drains Lake Lohalla were spotted, and the Black Cat dropped flares which showed them clearly. The PT's came up and opened fire, while Vogt's gunners strafed.

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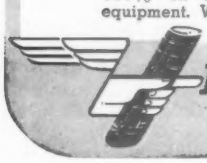

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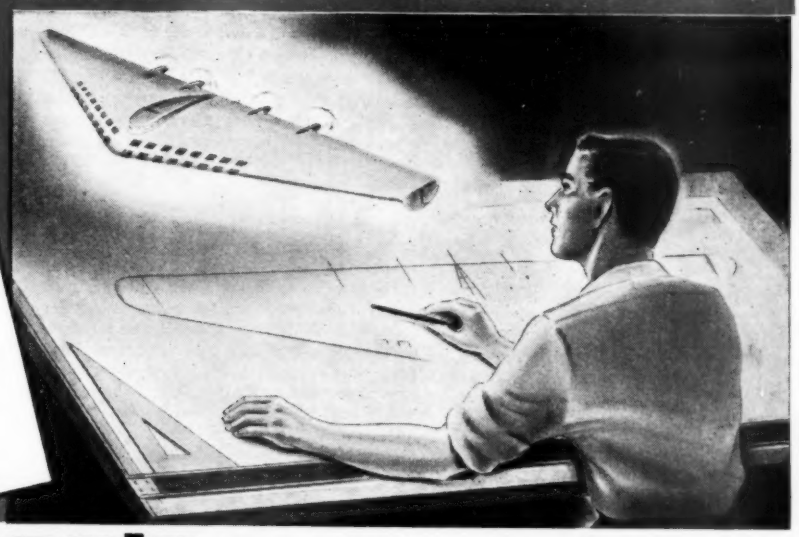

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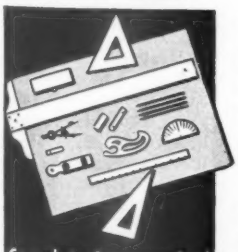

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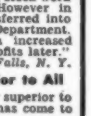

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Later, with his ammunition expended, Vogt dropped his last seven flares along the shore line so that the PT boats could continue, then he returned to base. It was three o'clock in the morning when Lieutenant Leydon landed.

"Wonderful," he said. "Now I understand why you birds can't judge your own bombing results but can still direct our fire. Damned fine work, I call it."

"Those PT gun crews aren't so dusty, either," said Vogt.

"I guess we all are just about perfect," admitted Leydon modestly. END

The Flight Surgeon

(*Continued from page* 128)

in attitude among those weakening under the tension of combat. He would counsel the personnel, talking of the various phases of their work, answering questions about personnel problems, ranging from love to the qualities a brand of hooch should possess.

"Many amusing incidents occurred during the air raids. It was common to fall in a strange foxhole on the way to your favorite ditch. This could be as serious as getting hit on the head with a cocoanut. The former made you a member of the Mistaken Groundhogs, the latter a fellow of the 'Nut to Nut Club.' Another surprise was to jump down into a supposedly dry hole, and go up to your knees in water and mud. Rats used the holes as hideouts, but they were little fellows and took it on the run when human occupants arrived."

Conditions such as these lead to the dreaded pilot fatigue. Fatigue may be more than a physical weariness; frequently it also involves the mental. The flight surgeon must know his men and be able to gauge accurately when the breaking point might come. It is up to him to ground the pilot and prescribe the cure. Perhaps it will be rest, treatment by drugs, mental readjustment, or even transfer from the squadron to some other duty.

Pilot fatigue usually springs from a combination of causes. Fear may be a great part of it. Man has to recondition all his reflexes to fly. In combat a pilot cannot yield to his natural reaction to run away. There are, moreover, many details to remember. And besides the enemy, there is the weather, navigation, formation flying, protection to others and —highly important—a great sense of personal responsibility. A dive bomber pilot has over 40 things to remember while making his dive. Above tough enemy territory he must charge his guns, trim his ship, turn on the cameras and the windshield heater, crack his flaps, arm his bomb, come in exactly at 15,000 feet, pick up a high speed approach around 320 m.p.h. before diving, fly directly into enemy gun barrels, release the bomb at 1,500, pull out at 1,000 or 500, close the flaps, run like hell and join up at the rendezvous point.

The flight surgeon has to know just how long each individual member of his squadron can take that kind of a routine. He has to know everything about every man in his squadron. He accomplishes it by living as one of them, speaking their language, thinking their thoughts. There is no emphasis on formality. The surgeon is generally called "doc," like the family doctor at home.

One flight surgeon said that before he could be "accepted" he had to learn poker and ribald stories to converse with some of the flyers. Another had to pray and read a chapter in the Bible. One pilot wanted the surgeon to take up water colors, and he did. The flight surgeon often provides ice-cold beer and arranges for massages. In one case one wangled a gigantic electric refrigerator (courtesy of those talented appropriators, the Seabees) and taught a pharmacist's mate how to give a really professional rubdown to pilots who had been in the air more than four hours at a stretch. The surgeon must also be able to fly, even though flying is not his natural inclination. Never allowed to show fear, he must always be the last man in a foxhole. He must inspect the mess and see which pilots are eating, and which are not. Perhaps he will produce a can of boned chicken for a midnight snack with the lad who is losing too much weight. One surgeon gave a full course in jungle lore and survival. It was up to another to give a complete course on married life.

The average flight surgeon, to his dismay, is faced with few major medical problems. Generally there is always a base or mobile hospital with full surgical complement within reach of any squadron. The flight surgeon is rather similar to a football coach, with medical overtones. Some of his most common medical duties are as follows:

He must always watch out for malaria and evacuate the infected flyer.

He must be prompt in grounding the flyer with a cold or one being given sulfa drugs.

He must be on the lookout for anoxia—lack of oxygen. Anoxia is both insidious and cumulative. It makes the pilot sleepy, or sometimes as exhilarated and reckless as a drunkard. At forty-two thousand feet, without oxygen, one can only live eight seconds; at 30,000 feet oxygen is absolutely necessary; at 12,000 it is dangerous to stay long without your mask. Most flyers fly between 15,000 and 20,000 during an air engagement, at least for short periods of time, and many do not want to be bothered with masks. Some even think it's sissy. Such men must be watched and advised.

The flight surgeon must see that none of his men are victims of the "bends," those bubbles in the blood stream to which certain flyers are as susceptible as deep sea divers. Intestinal gas accentuates the "bends." Diet, therefore, is important.

He must warn against and keep preventing athlete's foot and fungus infections generally. The ears are particularly vulnerable to some of these.

He must, in fact, be "ear" conscious,

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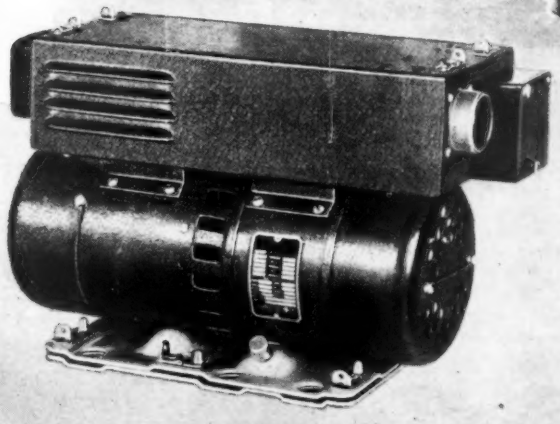

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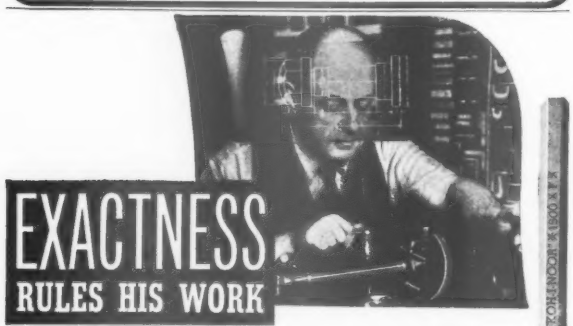

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Most flight surgeons are young and many of them were trained in civilian life for surgical specialties. As recently written in a report, "It is to their everlasting credit that they are taking this new sort of specialized duty without complaint." Now and then, however, some flight surgeon wishes he could act briefly as stand-in for the pharmacist's mate who borrows a safety pin and a pair of pliers and performs the dramatic emergency appendectomy.

Whatever their personal hopes and fears, the flight surgeons have suppressed them and accepted the humbler task, working wonders with simple common sense. Here are some examples from the Navy's records:

Pilot A, an ace in any league, credits his life to a gadget his flight surgeon placed in all the planes of that famous fighting squadron, VF-17. Dr. Lyle F. Hermann had the forethought to install a tiny ammonia bottle where the pilot could uncork it and sniff it if he were hit. On several occasions these little bottles kept pilots conscious until they could make an emergency landing.

Pilot B had been a wonder at training school, but in combat he was a flop. His flight surgeon discovered that he had been married just before leaving the country and that his wife's letters were making him cautious. The surgeon wrote to the girl secretly, explaining that over-caution was sometimes more likely to be fatal than recklessness. She responded promptly, writing back "fight" letters. Since then Pilot B has maintained a record everyone can be proud of.

A flight surgeon noticed that Pilot C, hitherto an excellent flyer, was getting morose and sulky. The cause was very trivial, almost silly from an adult point of view. But the boy wasn't an adult. He and a former schoolmate, rivals for the same girl, had gone into the war at approximately the same time. The Navy flyer had had more combat missions than his rival, but he was still a jg while the other suitor, a member of the Army Air Forces, was a captain. The Air Force pilot had an Air Medal; the Navy flyer did not. The girl had made some slighting remark about the Navy boy's record. He was understandably hurt.

In restoring his morale, the flight surgeon convinced him that medals are for boy scouts and that everyone knows, without counting medals, that a Navy flyer can fly rings around any other pilot in the world. Then he wrote a letter to the girl, praising Pilot C's combat record, half jestingly, half seriously, and also Pilot C's modesty. This program seemed to work out fine.

Dive bomber Pilot D was so cautious everybody thought him a coward. The flight surgeon, winning his confidence, learned that he felt a tremendous weight of responsibility for the safety of his rearseat gunner. It was making him afraid to fly. Transferred to VF-33, a fighter squadron, where he was alone in a plane, he made a remarkably fine showing. He liked it so well that he turned down his leave and recreation week at Sydney, so that he could keep on knocking Japs out of the South Pacific sky.

The flight surgeon learns that some pilots love to fly and fight. They believe in the war and come from well-adjusted families who are behind them 100 per cent. By nature they are aggressive. Probably they had previously been enthusiastic about the "blood" sports of hunting and fishing, which are good preparation for combat. The flight surgeon may have difficulty making such a boy take his war in moderation and not burn himself out.

Joe Foss is such a flyer. Comdr. D. C. Gade (MC), USN, writes the following story about this Marine ace who has knocked down 26 Jap planes:

"There was one day on Guadalcanal that Maj. Joseph J. Foss, USMCR, will doubtless never forget. At dawn, while he was flying patrol, some Zeroes tried to sneak in and strafe Henderson Field. Foss got one. Later in the morning more Zeroes came over and Foss got three more. Upon returning to the field and landing, he heard the rumor that snipers had broken through the ground lines and were shooting up the airfield itself. So, armed with his .45 caliber pistol and his

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lucky hunting cap with its brim turned up, he went into the jungle looking for snipers.

"Shortly thereafter enemy dive bombers made an attack on the field. Out from the jungle came Joe, yelling to another pilot to jump into a plane and follow him. Foss' plane had engine trouble. On the first try at a take-off he was unable to get the tail up; so he taxied the full length of the runway to try again. On the second attempt he got only 25 feet of altitude before the engine cut out and the plane crashed.

"When the flight surgeon arrived on the scene, fully expecting to find a mortally wounded pilot in a crumpled heap, Foss was standing under a tree about fifty yards from the wrecked plane. Blood was streaming down his face, and he was shaking his fist at the Jap dive bombers and cursing ingeniously. His first question was: 'This isn't going to ground me, is it, Doc?' He had only minor injuries, so in a few minutes he was patched up and pronounced fit to take to the air again.

"With all his love of flying," Gaede concluded, "Joe got tired now and then. All of the squadron members were finally worn out, but it took dysentery, malaria and a temperature of 105 before Foss was willing to knock off for a while. He was removed from the combat area and, after a short period of rehabilitation in more civilized surroundings, was again returned to Guadalcanal. He served three tours in combat, and then returned to the homeland for a much-deserved and prolonged rest."

Not many flyers can be like Foss. To go back to the typical, here is the way Pilot X was handled by Flight Surgeon Y. X had been shot down and forced to make a dead-stick landing. Rescued by Dumbo, he was still pretty well shaken up. Flight Surgeon Y, who grounded him, had to listen to his account of getting into the rubber life raft over and over again. In a few days the pilot said, "Doc, how about a Pistol-Pete hop?" Pistol Pete is the name applied to the local Jap artillery, usually antiaircraft guns, hidden in the hills.

"Sure, I'd like to go," said the flight surgeon who, incidentally, always got sick in airplanes.

He climbed into the rear seat of a dive bomber, attached his earphones, and cut off the twin .30-caliber guns for fear he might hurt somebody. Once they were in the air, he said to the pilot on the interphone: "Man, what a take-off! What a wingover! Wonderful!"—all in line of keeping up the boy's morale.

In a few minutes Pilot X spotted a Jap gun and blithely dived upon it, his .50's blazing. His bomb was dropped with beautiful accuracy.

"How'd you like that, Doc?" he shouted.

After a long silence Flight Surgeon Y answered weakly, "it's right on the button."

Pilot X wasn't listening. He was jabbering with excited assurance as is the manner of pilots hopped-up after tasting battle. His nerves were mended. Tomorrow he would fly with his squadron. Pilot X had been solved.

But in the rear seat Flight Surgeon Y was quietly being sick. There wasn't anybody to ground *him*. END

Campaign by Air

(*Continued from page 47*)

been in process of development and active use for about 10 years. Outnumbered and inexperienced, the Navy steamed into Japanese waters to open an amazingly bold offensive. The Guadalcanal campaign, fought mainly by the Marine Corps, has become familiar history, but the remaining march up the Solomons was comparatively unheralded. Guadalcanal fell to us in six months and two days of the bloodiest fighting of the war. Promptly after declaring it ours, we proceeded without opposition to the nearby Russell group of the Solomons. The strategy of this move was aimed at getting our fighter planes within range of Munda and Kolombangara, of the New Georgia group, which the Japs were developing rapidly in support of their abortive Guadalcanal drive.

From the Russells we sent fighter planes manned by New Zealand, Marine Corps, Army, and Navy pilots sweeping over the Jap air strips. For some time enemy air opposition came up in force. But, consistently knocked down at a ratio of more than five to one, Jap air power began to wane. Establishing a pattern that was used throughout the whole Solomons advance, we sent over dive and torpedo bombers to beat up the Jap air fields and nullify their potential air strength. Having accomplished this on Munda and Kolombangara, we invaded Rendova, on New Georgia, toward the end of June, 1943. Marines with more than 150 big guns were landed directly across the bay from Munda, where they opened a heavy bombardment. But the Japs were solidly entrenched on Munda. To uproot them it was necessary to pull a rather spectacular flanking stunt.

Destroyers landed additional Marines *behind* the Japs on Munda, at Enogai Inlet. The position was so isolated after they disembarked that the troops had to be supplied by parachute and their wounded evacuated by seaplanes. This hardy band pushed on across Enogai Inlet while the Rendova group continued the shelling and our planes of all types worked on the enemy installations. The Japs on Munda suddenly found themselves caught in a pincer movement. Not only were they in the midst of a squeeze play on land, but their supply route across the Kula Gulf was menaced by both our Marines at Enogai and our planes from Rendova.

By that time, the Japs had been gradually effecting a transition in their supply methods. At first, having air supremacy in the Solomons, they used large ships indiscriminately. After Guadalcanal, however, our air opposition became so intense that their ships were being destroyed at an alarming rate. Consequently, the Japs switched to barges, running at night

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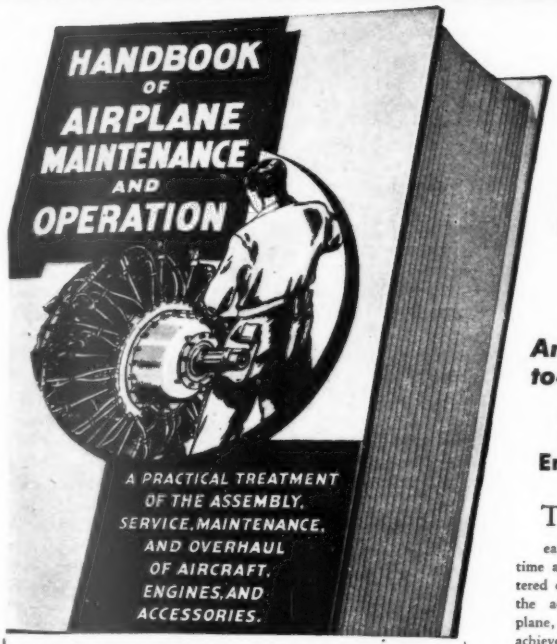

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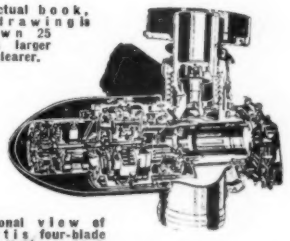

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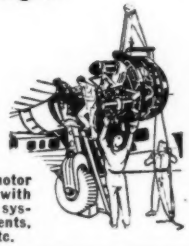

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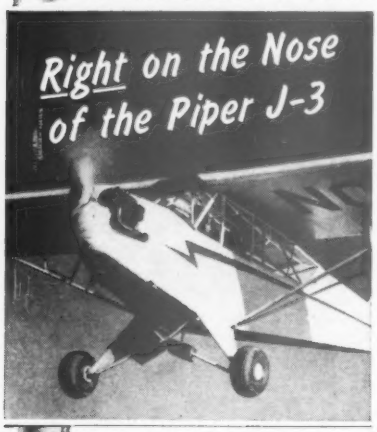

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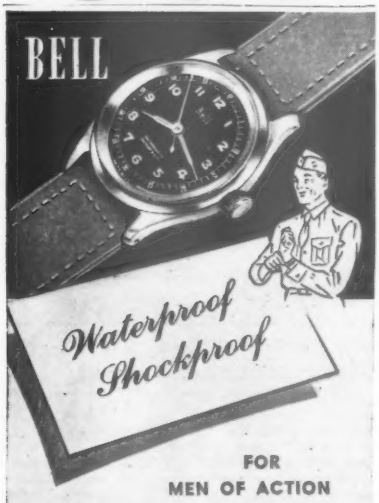

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and hiding during the day. Hundreds of these craft came out each evening shortly after sundown and scurried down from base to base, bringing in food, ammunition, medicine and men. Their route was roughly from Buin, at the south tip of Bougainville, to Vella Lavella, and then across the Vella Gulf. This strategy was well planned and called for decisive action by us. We countered with several kinds of opposition, including destroyers and other surface craft, but finally we hit upon a team consisting of night-prowling *Catalinas*, painted black, and motor torpedo boats. The planes, which became known as "Black Cats," would spot for the PT boats and also do a bit of bombing on their own. Efficiency of the teams was developed to a point where they gained a workable ascendancy over the Jap barges. Fighter planes occasionally helped in the hunt, strafing barges that had been located on beaches. It was an exciting and interesting sort of hunting and played an important part in the Solomons campaign, since one barge was capable of supplying about 6,000 soldiers for one day.

As the Munda campaign progressed we augmented the Marines on Enogai Inlet, continuing to land them by destroyer. An attempt was made to land troops by parachute but the jungle in that area is so dense that paratroopers could not function successfully. It was possible to drop men, of course, but rarely could they get together again. As the group grew on Enogai and the shelling increased from across the bay at Rendova, the Japs became discouraged and began an evacuation to nearby Arundel Island. Their closest air base was now Kolombangara, in the New Georgia group. Our plan at first was to send over the usual complement of Navy, Marine Corps, Army, and New Zealand planes and beat the field to a pulp, then invade. In some mysterious bit of strategy, however, the Japs unexpectedly quit using the field. Undoubtedly they elected to salvage as many planes as possible in a withdrawal farther to the north. We estimated that there were 10,000 Japs left on Kolombangara and decided to by-pass them. Instead of incurring needless losses there, we invaded Vella Lavella, landing New Zealand troops and seizing the airfield.

This strategy placed the Japs on the majority of the islands in the Solomons in a precarious situation. We were sitting right in the middle of their barge routes and it appeared that their future food supplies might be exceedingly meagre. The enemy chose to attempt a wholesale evacuation of several islands, including Kolombangara, Santa Isabella and Choiseul. They were able to get some men off Kolombangara and a few off Santa Isabella after heavy losses in barges and men, but the operation at Choiseul was thoroughly unsuccessful. There are Japs still on Choiseul and other islands in the Solomons. They have been by-passed and are reported to be in poor health.

Moving on northward, we landed on Sterling Island, in the Treasuries, and quickly prepared for a far-reaching move —to Bougainville within striking distance of the great Jap sea and air base of Rabaul. Bougainville was well fortified. It had several good air strips and the Japs gave every evidence of wanting to hold it. Rabaul, they no doubt realized, commanded the whole northward path through the Pacific and toward the Philippines.

To take Bougainville we had to depend more than ever on land-based aviation. Fighters of all available types began sweeps over the Jap airfields. After them, dive and torpedo bombers pounded every Jap installation in the most devastating air raids seen in the Solomons. The force of our attack was too overwhelming for effective resistance. Five days after our landing in the Treasuries we smashed ashore at Torokina, on the west coast of Bougainville, establishing New Zealand and Marine troops and Seabees on several beachheads.

Despite heavy Jap resistance on land and annoying air raids from Rabaul, we hung on and proceeded according to plans worked out by Admiral Halsey, chief commander in the area, Admiral Fitch, commander of air forces in the Solomons, his chief of staff, Capt. George Van Deurs, and by the combined staffs of Army, New Zealand, and Marine officers. Plans, which proved strategically perfect, were to grab a small area on Bougainville, build several air strips quickly, ring them around with ground forces, and hang on for dear life.

The landing took place on November 1, 1943. Within a month we were firmly established and an excellent air strip had been completed. Shortly afterward two more were finished. It should be added that during the fight for Bougainville the South Pacific forces had counted on substantial aid from other quarters. For one reason or another, such aid did not materialize. Admiral Fitch's air team had to neutralize the Jap air fields at Kahili and Ballale and on Bougainville from our new bases at Vella and Stirling (Treasury landing). The land-based forces once got a helping hand from the *Saratoga* and several cruisers, which cruised up and attacked Buka, the Jap field on the northern tip of Bougainville. The cruisers shelled Buka, then made a diversionary move, shelling a base some distance away. After that the *Saratoga* moved in with its air group and gave Buka a solid working over, tying up its planes during our Torokina invasion.

Then came the final operation of the Solomons. From Bougainville we set about the gigantic undertaking of neutralizing Rabaul, key enemy bastion. Planes of the Navy and Marine Corps, and of Army and New Zealand aviation performed miracles of endurance, daring, and skill. Besides the fighters and bombers, hundreds of patrol, search and utility pilots flew almost superhuman stretches in the effort to take the last of the Solomons from the Japanese. The heroic quality of their flying feats is more apparent when the true Jap situation at Rabaul is described. The Jap pilots at Rabaul were Navy and the best the Rising Sun had left. In the Japanese military system, Navy pilots receive training which is vastly more thorough than their Army pilots. This is necessary be-

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cause of the varied air operations Navy pilots are called upon to perform. They must operate from carriers, and their bombing work is often directed at small moving targets on the sea. Being particularly anxious to defend Rabaul, the Japs are believed to have brought in most of their remaining experienced Navy pilots. This proved to be a major tactical error.

We started a round-the-clock air offensive against Rabaul that could not be checked. There was nothing haphazard about the attack. The pattern was first to send over fighter planes of all four air services working under Admiral Fitch. These would lure up the Jap planes, knocking down as many as possible. Immediately after a fighter sweep we would send over dive bombers; behind them came the torpedo planes. Occasionally the Army would add medium and heavy bombers to the force. Primarily, the targets on these missions would be the enemy air fields. Our purpose was to beat up the fields so badly that the Jap planes would be held on the ground. Other targets would be the shipping in Simpson Harbor and various military installations at Rabaul.

The sweeps and strikes went out almost daily. A typical attack force consisted of dive bombers and torpedo planes, protected by strong fighter cover. On all of these missions, Navy, Army, Marine and New Zealand pilots participated as a team. The harmony and success with which the pilots and crews flew against the Japs under a Navy commander is one of the most comforting aspects of the war to date—it was Allied co-operation in the most realistic sense of the word.

During January the Japs lost 500 of their best flyers and planes. In the first week of February there was a noticeable slump in Jap resistance. Apparently they had received orders to cease being foolishly aggressive. Stockpiles of men and materials were undoubtedly getting low. Jap pilots still came up but they flew around the fringes of our formations, doing aerobatics and trying to decoy stragglers into range. Such a change of program was obviously too feeble to make much difference at that stage of the game. We continued to fly our tight formations and to destroy Japanese aircraft at the safe ratio of five or six to one. The Japanese slump grew more and more evident; resistance at Rabaul weakened rapidly in the next few weeks. In March we moved north from Bougainville and occupied the Green Island group, completing the domination of the last of the Solomons. With Rabaul neutralized and landings later made near it on New Britain, all real danger to our positions in the Solomon islands was ended. It was a campaign marked by brilliant strategy; it was one of the important in the war to date; and it was one in which land-based aviation of the Navy and Marine Corps unmistakably led the way. END

Recognition

(*Continued from page* 166)

stantly and opening fire—or seeking an air raid shelter. Intensive recognition education resulted. Models, movies, and instructors were used, with the emphasis on aviation, and civilians were organized under the Royal Observers' Corps. Everybody from children through service men to old men and women participated in the training program, which one U.S. Naval officer officially described recently as a "whale of a job."

U. S. work in the same field, spiced by some typical Yankee innovations, picked up where the British left off. Because the Navy usually had first and most frequent contact with the enemy, especially in the Pacific theater, it was the first to realize the seriousness of the recognition problem and to do something about it. By spring of 1942, the Naval Aviation Training Division in the Bureau of Aeronautics had completed plans for training recognition officers.

Up to this time, recognition had been taught by the so-called WEFT System—the letters representing wings, engine, fuselage, and tail—but difficulties were discovered almost immediately. It took too long to teach instructors and they, in turn, found difficulty getting their knowledge across quickly to men in the field. Some of these latter, in typical GI style, thought up a new set of words for WEFT that were neither complimentary nor printable.

An equally uncomplimentary opinion of WEFT was voiced by Dr. Samuel Renshaw, a professor of psychology at Ohio State University, who for a number of years had made a hobby of optics, carrying his studies to the point where he even tested the deterioration of the optic nerves under the influences of

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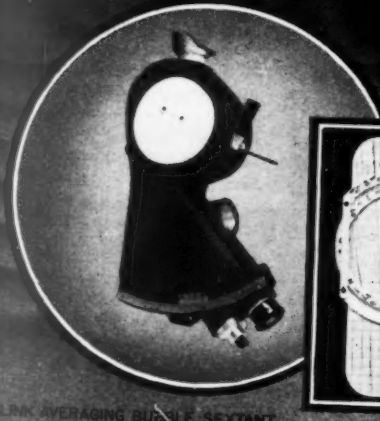

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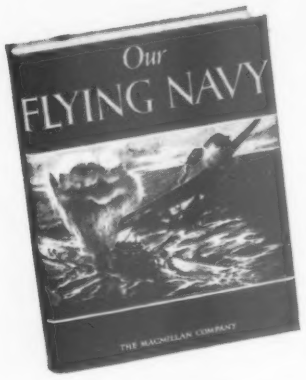

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alcohol. Dr. Renshaw, co-operating with Navy, favored discarding the WEFT system for a system of psychological recognition of planes. He pointed out that a small boy can tell you it's a *Thunderbolt* when the plane is a speck on the horizon even though he cannot tell you why he knows it's a *Thunderbolt*. The WEFT system, said Dr. Renshaw, involved too many opportunities for mistakes and too many delays in hair-trigger recognition. He proposed the "perception of total form" system—designed to enable you to recognize a plane as you'd recognize a friend, without realizing exactly why.

Implementing the educational work which resulted from the Renshaw theory was the use of flash exposures, which gave the student only time to see the total form. Silhouettes were flashed on a screen at a speed up to 1/100th of a second.

Incidentally, the Renshaw theorists toyed with the idea that, besides training a student in recognition, they would also improve his sight. There are two schools of thought on the subject, the other believing that eye-sight is not actually improved but that the student learns to use his eyes more efficiently, broadening his "cone of vision." Whatever the truth, recognition training was speeded up tremendously and became progressively effective in the field.

This is not to say that progress was steady. As was the case in almost every other aspect of the war effort, time became the chief ally of setbacks and failures. There wasn't enough time left in a world at war to train all the necessary personnel quickly enough to supply the immediate combat needs. Although every available recognition officer worked until he dropped to sleep on his feet, there was not enough time to train enough men to carry the colossal recognition load during the invasion of Italy—and a tragic number of our paratroop transports were shot down by allied surface craft who mistook them for enemy dive bombers. Recognition of ground and surface equipment, as well as aircraft, had to be taught. And it was found by recognition officers that while the basic psychology of the total form system was excellent, practical application in the field called for a number of changes.

Typical revisions were those made following the return from fighting areas of such men as Lieut. Friedrich Fleig, former baseball farm manager for the Cincinnati Reds. Fleig joined up for action and got it as a recognition officer at Guadalcanal. There he discovered he did not know enough about planes and especially new enemy models. Hating desk work, he nevertheless asked for transfer to Washington to set the informational material aright.

Gradually the wrinkles have been ironed out and typical American mass production methods installed. In May, 1942, a two weeks course for 25 A-V(S) officers brought in from Naval pre-flight schools was established at Ohio State University. An index to the lack of emphasis placed on recognition at the time was that this school was to be discontinued at the end of four months. But so many requests for recognition officers came in from the fleet that the work was continued.

Recruitment of civilians was required to meet the demands. By November, 1942, the first indoctrination class of 75 ex-civilians was opened, a 60-day course which eventually was taken by 550 men who are today serving on ships and at air bases of the Navy's far-flung battle-front. Men back from the fleet also continued to receive training.

By January, 1943, the quota of recognition officers was more than doubled, to 1,200 officers—training to go forward at the rate of 170 per month. On graduation these men went to all Naval activities other than aviation, the plan being to have recognition officers assigned to the ship's company of all units of the fleet from capital ships to destroyer escorts, and in shore-based activities.

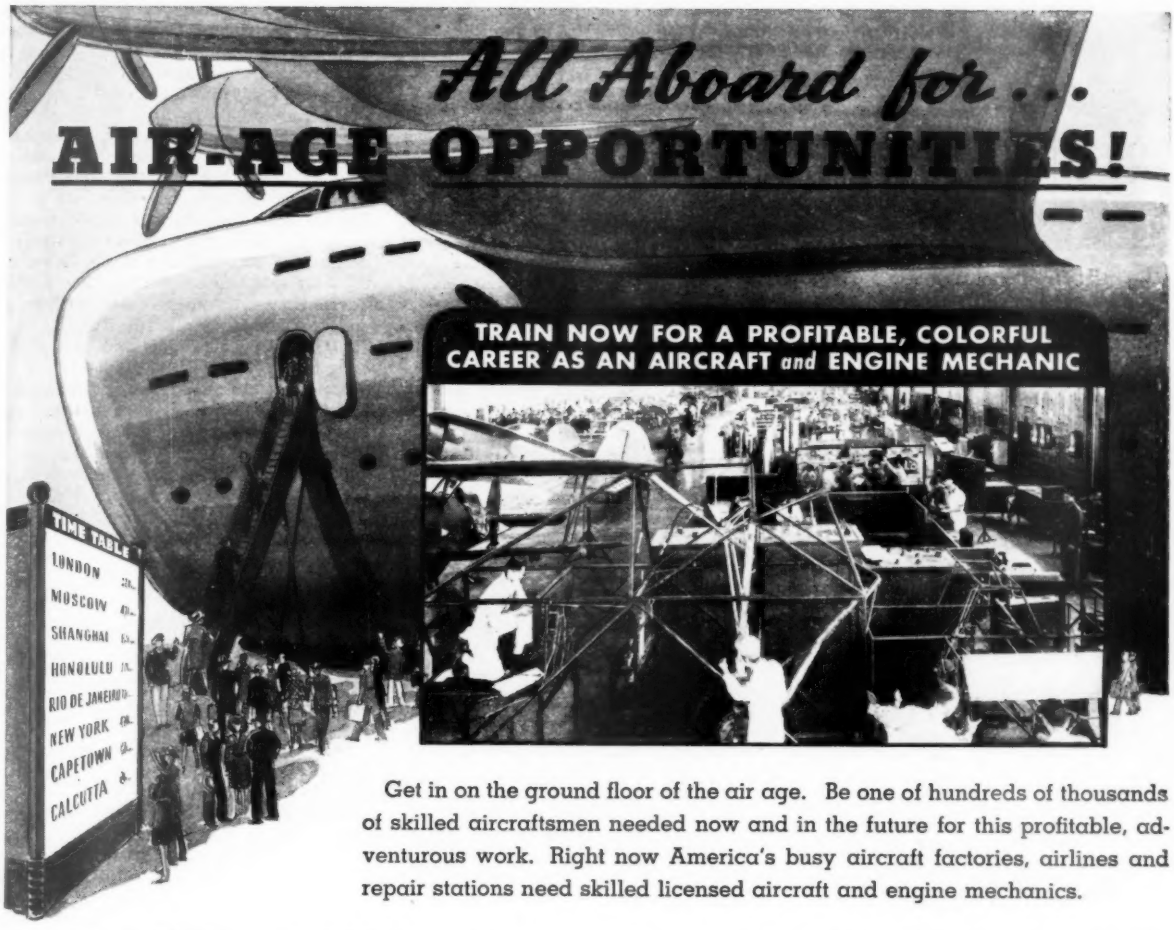
Another sea-duty bug in the program was that the recognition officer often found time hanging heavily on his hands. Not infrequently his total contribution was a few seconds' work similar to that recounted at the beginning of this article. Beginning in March, 1943, this was offset by sending all officers at Ohio State on graduation to Purcell, Okla., where they had 30 days' training at the Naval air gunners school. A few men were sent to air combat information school at Quonset Point, R. I.

By August, all recognition training for A-V(S) officers was completed after about 800 men had been trained. Refresher training is, of course, continuing.

As time went by and fleet commands recognized the value of recognition officers, duties at sea were increased according to the ideas of the command. There are more than 400 men aboard a capital ship who at one time or another must do look-out work. Recognition officers have been put in charge of intensive courses for these men. Lectures on up-to-the-minute intelligence on enemy equipment are frequent. Many recognition officers have graduated into intelligence work or added it to their schedule.

On the receiving end of the information, Naval aviators, of course, are at the top of the list. From the day a cadet pilot starts training until he goes into combat, he gets approximately 175 hours of recognition training. Refreshers when on active duty are numerous and detailed. Surface craft, both friendly and enemy, get almost as much attention as friendly and enemy planes.

In addition to cadet training, recognition instruction is given to enlisted personnel in technical training commands, Naval air gunners' schools, and operational training commands. For keeping these men up to date recognition officers also serve at Naval air stations, aviation free-gun units and Naval air transport squadrons. Groups are, as noted, assigned to fleet commands, including Comairlant, Comairpac, Comfair West Coast, Alameda and Seattle. Recognition officers are also attached to the staffs of the Naval air training command, Naval air primary training command, Naval air



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technical training command, and the free gunnery standardization committee.

The over-all program is under the recognition sub-section of the aviation training division, headed by Lieut. C. D. Coffman, former officer in charge of the recognition courses at Ohio State—and an assistant manager of the Mayflower Hotel, Washington, before he went into uniform. The program was organized in the spring of 1942 by then Captain, now Rear Adm. A. W. Radford, then director of Naval Aviation Training. At that time the work was supervised by Lieut. Comdr. W. W. Agnew.

Aiding in co-ordinating and disseminating information to the field is a committee meeting bi-weekly whose membership includes RAF and Army ground and air force officers as well as Navy leadership in the recognition field.

Even today the program is far from static. Fraction-of-a-second slides of planes are still "required reading" in refresher courses and to supplement lectures in the field and at sea, but a number of somethings new have been added. Among them are the shadowgraph, moving pictures and balopticans, not to mention a device that only American brains could have adapted to the uses of war—the pin-ball machine.

And daily from the battle areas come communiques testifying how the program has paid huge dividends by saving U. S. lives and personnel and by helping to destroy the enemy.

Despite the much-publicized transport tragedy during the Sicilian invasion and the fact that only 22 recognition officers participated, Adm. R. E. Ingersoll reported after the fighting was over that "the efficiency of the identification officers in the operation was extremely gratifying." As a result of the Sicily incident, Rear Adm. Alan G. Kirk, in charge of amphibious operations then as well as against France, recommended that a recognition officer be stationed on all battleships, cruisers, destroyers, transports and cargo ships in amphibious operations. This recommendation has since been adopted and there are today more than 2,000 recognition officers on active duty.

Scores of anecdotes spice the reports from battle areas. There is the one of the U.S. dive bomber squadron leader who peeled off in a contested area in the Pacific which he thought was patrolled by enemy ships only. His target was a battleship. And then he remembered its lines—it was one of our own fleet. Had he continued his dive, death to himself and his companions or destruction of a $100,000,000 battlewagon and loss of its crew might have resulted.

Fleig, teaching in a grass hut in Guadalcanal, had one of his students come back from his first combat with a Jap *Hamp* to his credit. The *Hamp* had come upon him suddenly but the young American pilot had immediately opened fire. Why?

"It was a *Zeke* with square wings," said the victor. "I recognized it immediately from the slides we used to study."

Recognition—or lack of it—works both ways. A Jap pilot who apparently hadn't studied up recently sidled up to a *Liberator* in a *"Jake,"* Jap single-engined float observation plane sometimes used as a dive bomber. He thought he was among friends—until it was too late for him to get away.

One of the most enthusiastic partisans for recognition training is Vice Adm. Marc Mitscher, skipper of the now famous Task Force 58. Admiral Halsey is another.

But perhaps the best example involves a carpenter's mate on a destroyer in the Atlantic fleet. With a battle station below decks, he began to study under his recognition officer as a hobby. He proved to be an expert in short order and today, when the shooting begins, his station is on the bridge beside the skipper. END

Air Combat Intelligence

(*Continued from page* 124)

In giving his own pilots information on enemy planes—the ACI officer needs accurate statistics. To procure these, Air Technical Intelligence officers who have received specialized training in airplane construction go into each area and prepare reports on any enemy aircraft that is shot down, sometimes restoring planes to almost perfect shape. They spot new engines, changes in armament and armor, shifts in the location of fuel tanks, development of new instruments for night flying and improvements in design. They ship parts, engines, even whole planes, back to rear areas for testing. When enemy airfields are captured these officers go in with the troops to examine the planes.

No matter where he is stationed, the ACI basic job is to get The Word to individuals who can use it most effectively. He may be helping to analyze combat reports, instead of preparing them; he may be helping to distribute them, he may be overseeing the preparation of charts or working with an aviation materiel command—in any case the objective remains the same.

It was a quick jump for the graduates of the early schools from studying identification at Quonset Point to interviewing *Dauntless* pilots at Guadalcanal. Since the first class went out, graduates have been at Port Moresby, all through the Solomons, at Tarawa and Kwajalein; over The Hump to China; in the fog of the Aleutians, and through the North African, Sicilian and Italian campaigns. Many have been wounded, 11 have been killed. Quite a few have been decorated or received special commendation for their work in briefing flight crews and analyzing their reports.

Most important, the reports they have furnished, the original work they have done and the speed with which they have got information out—to pilots, to staffs and commanding officers, to materiel officers and training officers and others who needed it—all these things have been of great help in the successful prosecution of the war. END

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Safety Equipment

(*Continued from page 184*)

hovering aircraft to be followed by the uninjured crewman.

A portable emergency battery radio which is standard in some bombing and transport squadrons saved a *Ventura* plane in the Pacific some months ago. The search plane was returning from a routine patrol when the pilot sighted a plane which he recognized as a new Japanese patrol bomber called the *Emily.*

Despite his dangerously dwindling gas supply the young pilot decided to have a crack at the four-engined boat. He not only drove home his attack vigorously by making four runs on the enemy plane, but he also took pictures with a small pocket-size camera He did not break away until his ammunition was expended and one engine of the target plane was smoking.

When he returned his attention to the problem of getting back to base, he found that the voltage regulator had become fouled while the top turret was in operation and the whole electrical system was now out of commission. He had no radio, no fuel gauge, no compass. He needed no fuel gauge to tell him he was desperately near being out of gas. The crew, meanwhile, had broken out the portable emergency battery receiver. With this little set the radioman picked up the range at the base and within a short time they were homing on the beam. Without communicating with the tower and without making the customary recognition turn the pilot landed. He had 10 gallons of gas.

This was high poker boldly played. It was later learned that the enemy plane crashed in landing. There was no doubt in the crew's mind as to what item of equipment won that gamble.

To train the Navy's airmen to escape their sinking planes, ingenious devices known as the "Dilbert dunkers" now give plane crews practical experience in escape procedures. The "dunker" is nothing more than a plane cockpit rigged so that it may be dropped into water under conditions simulating a crash landing. The student straps himself in the dunker with safety belt and shoulder harness. The dunker then is plummeted into the water and the airman is allotted 30 seconds to make good his escape from the submerged cockpit. If he doesn't show up in that time a life-saver goes after him. Instructors at the Naval air training stations, where the dunker is in use, claim it is the nearest thing to an actual forced landing and resultant submersion yet devised as a training aid.

A recently-returned commander of a *Liberator* squadron operating in the Pacific reiterated the importance of Stateside drill: "One of our planes went in about 1600. Ditching procedure up to the point of getting out of the plane was carried out in good shape and all of the main items of the life raft equipment were assembled and found to be in working order. This included a combination radio and signal light, and it was a good thing, too. It was dark when a Dumbo arrived looking for the crew. They signaled with their light. The next morning the crew was picked up at 0600.

The commander pointed out that the only two men lost could not swim. They had their Mae West, but apparently they strangled in the rough water as the result of not having mastered the breathing habits natural to all swimmers.

Mariners since time immemorial have dreamed of the day when someone should discover a way to make the oceans yield drinkable water for ship-wrecked survivors. An individual can live without food for about one month, but without water and, under ideal conditions, his maximum survival time is limited to about 10 days.

Today the Navy's airmen, like the mariners of old, harbor a fear of the day when they may be tossing about the open sea in a tiny life raft with only a limited drinking water supply. The bigger life boats and life rafts of ships can and do carry 10 quarts of water per man—a supply adequate to meet man's pint-a-day water requirements for 20 days. But the tiny collapsible life rafts of the Navy's combat planes have necessarily been limited to less than a two-day emergency water supply.

Spurred by the war, experiments to find a way to make sea water drinkable have flourished. Efforts to concentrate water into tablet form have not yet been recorded, but some of the "inventions" appear to be pure Rube Goldberg. For example, one proposed gadget would have caught and condensed the vapor of man's breath.

Out of this maelstrom of "inventions" have emerged three methods for extracting drinking water from the sea that are believed practical. They are:

1. The addition of chemicals to a container of sea water to remove the salt.
2. Distillation of sea water in small, fuel-burning stills to produce fresh water.
3. Distillation of sea water in "solar stills" in which the heat of the sun alone accomplishes the distillation process.

Of these three more practical methods for making salt water drinkable evolved in the past three years, chemical de-salting has the best overall rating. The bulk and weight of the fuel-burning stills restricts their use to large life boats and rafts. They are affected adversely by wind and waves, and their operation is the most complicated. Sun stills, although extremely light and compact and simple in operation, are in the development stage.

A chemical salt remover kit is being substituted for one of the two cans of emergency drinking water in the life rafts of the Navy's combat planes. The kit weighs about two pounds. Packed into a container the size of a package of ordinary baking soda, the kit contains enough chemical to produce six pints of drinking water.

Operation of the chemical de-salting process is quite simple. A small plastic bag stowed in the kit is removed and filled with sea water. Into it is dropped one of the six chemical "briquets" contained in the kit. Each briquet will produce about one pint of fresh drinking water. The water and the chemical are

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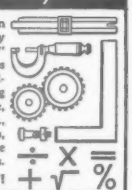

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agitated in the bag for about 20 minutes, during which time the salt in the water is thoroughly precipitated. Potable water then may be sipped from the bag through a rubber tube attached to its bottom. A filter in the tube keeps the chemicals and precipitated salts out of the drinker's mouth.

There is mending tape in the kit in case the plastic bag gets torn. In an emergency, the metal kit itself may be used for the de-salting process instead of the plastic bag.

A mirror for signaling has become standard equipment in practically all survival kits and life boat lockers of United Nations planes and ships. The Navy has found that flashes of sunlight reflected from a tiny mirror no more than 3 x 4 inches in size can be seen at distances three to five times those at which a tossing life raft or lifeboat can be recognized at sea.

The difficult part of signaling a potential rescuer with a mirror has been to aim the reflected sunlight so that it would strike the target. Life or death might depend on the reception of the signals by the target. Many schemes for aiming the reflected sunlight have been suggested and tried. To date, the "reflex button" type mirror has proved the most successful.

This is a small, flat signal mirror equipped with a red retro-directive reflector button of the type widely used on highway markers and on vehicles. The reflector button is spring-attached to the rear of the mirror, partially covering a small window about three-fourths of an inch square cut in the center of the mirror. As soon as the signaler catches the sun's reflection in the red glass reflector button, he takes aim on the target with the mirror, sighting the target through the center window. In tests, an average of 35 flashes a minute have been received by target planes from signalers using the reflex button mirror. Other types of mirrors used in the same tests have recorded 14 or fewer flashes per minute on the target.

There exists a real correlation between successful combat operations and safety equipment. It can be calculated in terms of morale, in the arithmetic of men who are rescued to fight again. It represents as real a factor in our success against the enemy as greater firepower and greater horsepower. That the Navy has recognized this from the start has meant much toward our outstanding supremacy in aerial warfare. END

The WAVES

(*Continued from page* 159)

the oxygen supply is turned on. When a "chill run" is made, they fit electrically heated suits and regulate the temperature. Simulated hops of 30,000 to 40,000 feet are made to demonstrate to flyers and their crews the problems and dangers of high altitude flying and the need and use of oxygen equipment.

The 16,000 WAVES on duty in aeronautics as of July 1, whatever their rating or rank, are a large factor in Naval aviation. They've made their way in a man's Navy, and from apprentice seaman to Cominch their service is recognized. For the record, Adm. Ernest J. King has written, "As a result of their competence, their hard work and their enthusiasm, the release of men for sea duty has been accomplished in many cases. The natural consequence is an *esprit de corps* which enhances their value to the Navy and it is a pleasure to report that, in addition to their having earned an excellent reputation as a part of the Navy, they have become an inspiration."

But the laurels on their brows are not nearly so coveted as the right to wear the proud words "U. S. Navy" on their hatbands. Recently one long-awaited victory came to the WAVES. The Bureau of Naval Personnel issued a directive cancelling the restriction of flight orders to WAVES. They are now allowed flying time in "other than combat aircraft." Thus, this side of Heaven, WAVES may be said to have wings. END

VTB—The Torpedo Bombers

(*Continued from page* 66)

attained in glide bombing attacks far exceed the maximum speeds obtained by dive bombers.

An incident that fortunately had a happy ending will serve to bring out the necessity of teamwork and of sticking together. Three Navy torpedo planes left Henderson Field to attack the Tokyo Express. There were several dive bombers along and a good Marine escort. The torpedo planes broke off to bomb two transports which had previously been stopped by torpedoes and were endeavoring to unload troops. The attack was delivered and the leader and one wing-man joined up. They looked over their shoulders and saw flame belching from both transports. Then they looked at each other and grinned. They looked over the other shoulder and the grins left their faces. The third plane was missing and could not be seen. Above, covering their tails, was a lone Marine fighter. Presently, over the radio, came a weak voice, "Hey, Skipper, wait for me." A look astern revealed the third plane moving up. This gunner had already knocked down one Zero but another was in hot pursuit. As the three planes effected a quick rendezvous with the Marine still overhead, the Jap decided it was an unhealthy area and pulled away. A discussion of the situation disclosed that the third pilot had turned the wrong way after his dive and thus found himself alone.

That foray in November was the last attempt of the Japs to move any sizable

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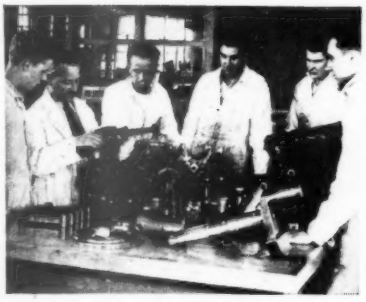

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surface units toward Guadalcanal for several months. However, the torpedo planes were not idle. They were assisting ground troops and laying enemy air fields to waste. They used glide bombing attacks for airfield attacks. At night they laid mines in enemy harbors and attacked enemy surface vessels

The pilots who fly these torpedo planes are about the kind of men you would expect them to be. They are healthy, hardy American youngsters who have been thoroughly trained in their numerous highly specialized forms of warfare. In an effort for a more detailed study of what it takes, the pilots of the very successful Squadron Sixteen aboard a big carrier in the Pacific were interviewed individually. They would, unlike the fictional aviation enthusiast, rather eat than fly. They like their job because of the variety it offers, and their principal ambition—this was unanimous—was to get the war won and get back home. Their ages range from 20 to 35 years; the majority of them are married and most of these have at least one child. Nearly all had gone four years to college and had joined a national fraternity There are four Phi Beta Kappas in Squadron Sixteen. They all like music and athletics and most of them write home every night. END

CV—The Carriers

(*Continued from page* 303)

cause he "had timed the release wrong" and gotten some bomb fragments in his plane's tail, his bomb hit the ship squarely amidships, set it afire and broke its back. Later in the day, Kern and his squadron commander, Lieutenant Commander (now Comdr.) R. H. Isely, USN, went after a heavily armed Jap warship with rockets. They so weakened its defenses with direct hits that the bombers later had no trouble finishing it off. So far, "two for two" to quote Kern's baseball language. On the second day, the torpedo planes, carrying four bombs each, were instructed to make only one dropping run. Since Kern wasn't sure he could release all four of his bombs at once and make them count, he waited until he found two Jap ships in line. He completely turned over a 6,000-ton ship with his first two bombs. The second two bombs wrecked a 4,000-ton ship on the beach. "I only made one run, just as I was told," Kern reported quietly when he returned to his ship.

* * *

ON THE morning of November 11 the planes of an *Essex*-class carrier attacked Rabaul (along with other carrier planes) and returned with a score of 14 Jap planes shot down, one destroyer sunk, and eight cruisers damaged. They refueled and took off again but received word that 126 Jap planes were on their way in to attack the task force. It was said the Jap attack force consisted of 80 dive bombers and torpedo planes, half a dozen big bombers, and 40 fighters. The planes of the *Essex* air group hung around to provide a satisfactory reception. In all, 46 Jap planes hit the ocean, 41 of them to the fighter squadron that had chalked up 14 during the morning. Lieut. (jg) A. E. Martin, USN, was high man with four, while Lieut. (jg) E. A. Valencia, USNR, knocked down three and a half, according to the Navy's strict system of keeping score. Only one of the 126 Jap planes got close enough to the carrier to drop a bomb—it missed.

* * *

JUST as Lieut. (jg) George M. Blair, USNR, got on the tail of a Jap torpedo bomber at Rabaul last November, his guns jammed. Instead of going back to the carrier to complain about his hard luck he put on more speed and pulled up directly over the Jap. Then, at a distance of 12 feet, he released the auxiliary fuel tank of his *Hellcat* fighter. The tank hit the Jap plane, which burst into flames and nose-dived into the sea. Two months earlier, in an attack on Kwajalein, Blair had run out of ammunition before he had finished off the Jap he was chasing and had stayed on its tail until he "ran it into the ocean."

* * *

ENS. J. R. BERTIE, USNR, was wounded over Tinian in an inconclusive struggle with a Jap plane. As he started back to the carrier he saw two Jap planes. He opened up on the nearest. *Both* of them burst into flames, a clean-cut double. At Truk, a few days earlier, Lieut. (jg) T. D. Schofield, USNR, sent a Japanese plane into flames as he chased it toward the earth. The flaming plane cartwheeled into a parked row of three single-engined *Kate* torpedo bombers. All three of the parked planes also burned.

* * *

LIEUT. R. R. BAYSINGER of Stockton, Calif., and Lieut. (jg) Boyd Weber, Fulton, Mo. joined up their *Hellcats* for the long trip "home" through the darkness after a long-range attack on the Jap fleet in the Battle of the Eastern Philippines. They reached the task force together, found a carrier and went into the same landing circle. Weber saw Baysinger make his approach and land, then he himself entered the approach circle. landed and asked for Baysinger. He then discovered that Baysinger had landed on another carrier! The same night, Lieut. (jg) Arthur Ward of Audubon, N J., landed on the first carrier he could find in the darkness, asked, "What ship am I on?" It was his own.

* * *

ON AN unspecified date in the early summer of 1944, Lieut. (jg) William A. Johnson, Crystal, N. D., brought his Douglas *Dauntless* bomber in for the 75,000th landing on the flight deck of the *U.S.S. Saratoga*, oldest and still the largest aircraft carrier in commission. Johnson's radioman was Oliver F. Tarr, ARM 2/c, of Huntsville, Ark. Sixteen years earlier the first landing on the grand new flight deck of the *Sara* was made on January 11, 1928, by Lieut. Comdr. Marc A. Mitscher, USN, now Vice-Adm. Marc A. Mitscher, commander of the famous Carrier Task Force No. 58. END

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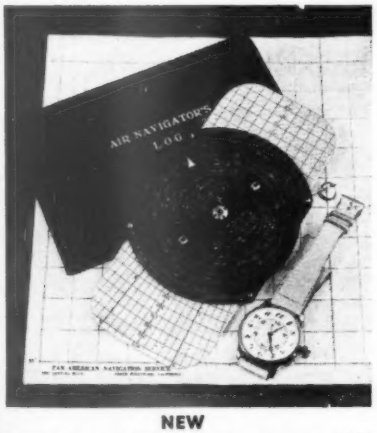

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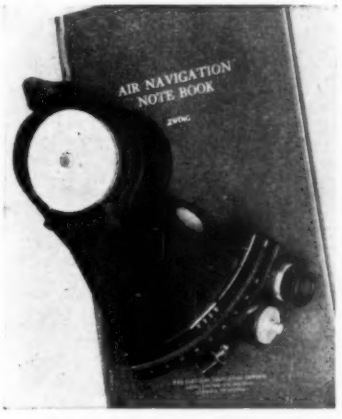

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